STUDIES OF AFRICAN ECONOMIES

FROM PAST TO FUTURE

Vol. 3

Editors
Thobeka Ncanywa
Benjamin Yamb

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Studies of African Economies

From Past to Future Vol.3

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Studies of African Economies: From Past to Future, Vol.3

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Preface

(Ch.1) Financial statements have become important sources of information about company performance in order to assess its financial stability and potential growth. However, additional information may be hidden on the interpretation in the values contained by financial statements. The study aims to assess financial performance with a case study of a company listed in the Johannesburg Stock Exchange utilizing financial statements and further investigate whether companies present their results precisely. The study intends to conduct an analysis on a company competitive positioning, valuation and financial stability. The results indicated that this case study's financial statement could be beneficial for assessment of company performance.

(Ch.2) African nations share a common situation in that they pollute little in terms of CO2s globally speaking, but at the same time global warming will likely have terrible consequences for the continent, set to face a sharp population increase. They have now access to few energy resources, which is conducive to their poverty. New renewables belong to the future (solar, wind, geo-

thermal), whereas old renewables -wood, coal-– are a thing of the past. The coal or oil and gas dependent giants must start energy transformation, as must the many countries relying upon traditional biomass, or charcoal. The use of wood coal is simply too large for the survival of the African forests. Africa need lots of energy to handle the coming crisis ofpotable water, as lakes and rivers are shrinking and degraded by pollution, dams and overfishing.

(Ch.3) The purpose of this chapter is to highlight the contextualization of the rule of minimum financial equilibrium through the financing of the long and medium term needs (BLMT) of SMEs in Cameroon. Surveys carried out in Cameroon in 2004 among 70 SMEs and in 2016 with 452 SMEs have shown that they finance their BLMTs with short-term resources, including tontines, microfinance institutions, business-to-business loans and grants, relatives. This is contrary to the orthodoxy of the rule of minimum financial equilibrium. However, these short-term resources are constantly being renewed to cover BLMTs.

(Ch.4) Natural resource ownership transfer programs are introduced as a way of improving income distribution and alleviating poverty in rural areas mostly in developing countries. The ownership transfer programs ranges from fishing rights ownership to rural land distribution programs under which the rural land distribution is the most dominant and common transfer policy in developing countries. Land redistributive policies can be viewed as an effective tool in reducing rural poverty mainly because agriculture continues to be the major source of rural livelihood and contributor to rural economic growth. For the structural changes and economy-wide impacts including behavioral changes of rural land distribution to be assessed and captured through time, a South African Social Accounting matrix can be used as a data base to construct a dynamic computable general equilibrium simulation model and simulate the potential impact on household welfare in South Africa. This study seeks to assess how government redistributive policies may affect household welfare in the short and long run focusing on poverty and income distribution in South Africa by applying a dynamic computable general equilibrium micro simulation model. The

results showed that rural land distribution increases poor household income through increase in factor by an average 0.828, however for most macroeconomic variables, the impact is negative in the short run with a gradual increase in the long run. The results support the claim that rural land distribution coupled with agriculture investment and government support can be effective in improving household welfare.

(Ch.5) This chapter measures the credit channel's parameters in monetary policy transmission in the CEMAC zone. Having highlighted the limitations of other channels with a theoretical and factual assessment, we check the effectiveness of bank credit channel through the autoregressive vectors' method, using consolidated monetary and macroeconomic data from six countries in the Zone, from 1960 to 2012. It appears that credit channel is narrow. It has a low outflow and a depth-based credit as far as the private sector is concerned, while the GDP reacts with a two-year period following a monetary policy impulse.

(Ch.6) Did British colonial policy primarily benefit Britain, or its colonies? Wadan Narsey, in *British Imperialism and the Makings of Colonial Currency Systems* (2016), claims that Britain established currency boards to help itself at the expense of the colonies. Examining the history of several currency boards and their assets for select years, Narsey finds that under British influence, they held lower-yielding, shorter-maturity British assets than they need have done, costing colonial governments revenue. We explore this idea by analyzing full annual data on the securities and assets of the currency boards of Palestine, East Africa, and West Africa. An accompanying spreadsheet workbook shows the details of the analysis.

Editors
T. Ncanywa & B. Yamb
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1 Assessing company performance using finalcial statements: Case study of the JSE listed company

T. **Ncanywa** [†], P.T. **Mogashwa**, S.B. **Molele**, O. **Ralarala**, & P. **Seshoka**

Introduction

Financial reporting involves the communication and disclosure of an entity's or economic unit financial information to the various stakeholders about the financial performance and financial position of the concerned economic unit (Oberholster *et al*., 2011). Moreover, in terms of section 1 paragraph 1.2 of the Conceptual framework, financial reporting provides financial information about the reporting entity to various users of financial information such as existing and potential investors, lenders, managers and other creditors (No, 2018). The information contained in the financial statements should enable concerned users who have reasonable understanding of business and economic world informed. The analysis process involves key financial ratios, financial amounts compared from the previous year and whether companies present results precisely.

A company's assessment is of paramount importance in developing and improving its performance (Najmi & Kehoe, 2001).

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In addition, it is an active measure in the decision-making process while controlling and planning a company's activities (Chan, 2004). The comprehensive assessment of a company's activity helps to manage processes to increase the business value and ensure its long-term success. Most attention is paid to the most sensitive parts of a company's performance, which are measured using financial statements (Taticchi & Balachandran, 2008).

In an attempt to assess whether companies report precise information, financial shenanigans are used in this analysis. Financial shenanigans are actions and omissions that distort a company's financial performance and conditions (Schilit, 2010). A company practicing financial shenanigans records deceptive revenues, records revenue earlier or later than its actual period, recording financial expenses earlier or later than the actual period, omitting or reducing liabilities from its financial statements and so on (Rezaee, 2002). Managers usually practice these conducts knowingly and with their consent. Accountants preparing information can manipulate the view of economic reality presented in such information to interested parties. These manipulations are regarded as morally reprehensible because they are not fair to users, they involve an unjust exercise of power, and they tend to weaken the authority of accounting regulators. The purpose of this study is to analyse the financial position and the financial performance with the case study of a stock exchange listed company anonymously called Company A here.

Company A is a Johannesburg Stock Exchange (JSE) listed company focusing on diversified property investments in South Africa, Australia, and Eastern Europe (Company A annual statement). The company registered as a public company in 1987 and listed under the financial real estate sector (REITs) of the JSE. In 2018, the company rated one of the top 40 companies that account for over 80% of the total market capitalization of all JSE listed companies. The key services that Company A offers entails: investing, owning, rental, finance and managing retail, office and industrial properties. Company A generates most of its revenue from rental income in the three distinct segments, namely: retail, office, and industrial. The retail segment generated total revenue of R3 244 million, accounting for 38.3% for the 2018 reporting year

whereas office and industrial accounted for 44.9% (R3 799 million) and 16.8% (R1 420 million) respectively of total company revenue in the South African group only. The company currently owns a property portfolio of 454 directly owned properties valued at R78.8 billion in South Africa and 57 properties valued at 33.6 billion through its 65.5% investment in Australia. For 2018 Company A reported annual turnover of R10 926 million (1.6% increase from 2017 financial year). Moreover, in the 2018 fiscal year, the company's operating margin stood at 72.9% as compared to 74.6% of operating margins for 2017 while the net profit margin was 61% compared to a net margin of 70% in 2017.

Literature review

Competitive positioning matrix is an index measuring the relative power and dominance of a certain business in a market in comparison with its competitors (David, 1997). The measurement include company-weighted average of the market share compared to its competitors, customer loyalty, product quality and price competitiveness (Altman, 2002). In addition, Simeonova-Ganeva *et al*., (2012) defined competitiveness of a company as when a company perform better and adopt a creative approach on its human, capital, and natural resources. This theory indicate the importance of the components mentioned by David (1997) as part of competitive position that companies can use to advance their competitive advantage. Darling (2001) established a model to be used by managers to gain a competitive advantage towards its competitors as well its customers using the elements identified by David, which were used in the European consumer market. A financial position assist management to evaluate past decisions and use these for future endeavors to grow companies (Mackevičius & Kkazlauskienė, 2009).

Financial distress models were designed to cap the disadvantages that arise when companies' financial analysts rely solely on ratios. Among the popular used financial distress models, include the Altman, the Z-Score or Zeta model and the newly founded model Rey model (Correia, 2015). Altman (1998) developed a model that consider different financial ratios such as equity to borrowed capital ratio, asset profitability before finance

costs, asset turn-over ratio, ratio of retained earnings to total assets and networking capital relative weight to total assets. Later, the original Altman model was modified into the Altman Z-Score model to create the emerging market scoring. Further modifications were created which included private firms, non-manufacturers and others (Altman 2000; 2002). Some researchers found the Altman's Z-score to be the most utilized and spread model (Kuběnka & Králová, 2013; Pitrová, 2011). They justified the Z-score model to be more reliable for the prediction of bankruptcies in the far future of companies. Studies done by Shumway (2001) and Hajek & Olej (2013) criticized the Z-score. They claimed that it is the static type of analysis, and can assess key conceptual dilemmas in financial reporting.

The financial stability of companies are viewed with market-based, resource-based, relational-based and knowledge-based views. The market-based view (MBV) argued that industry factors and external market orientation are the primary determinants of firm performance. Wang (2014) stated that the MBV included the company positioning and Huskisson's account of the development of strategic thinking. It is confirmed in Peteraf & Bergen (2003) and Wang (2014) that the firm's performance depended on the industry environment, and the position of the firm in the market relative to its competitors.

The resource-based view of the firm (RBV) refers to the firm's internal environment and views the structure of the industry (Wang, 2014; Furrer, Thomas, & Goussevskaia, 2008). Resources used by companies enhance its competitive advantage and focuses on resources to be used for competition in the company's environment. Researchers such as Ramos-Rodríguez & Ruíz-Navarro's (2004) recognized the resource based as a popular theory of competitive advantage. In addition to resource-based view some scholars regarded knowledge as a generic resource due to its special characteristics that make it the most important and valuable (Murray, 2000; Tiwana, 2002). Evans (2003) and Tiwana (2002) also suggested that knowledge is the most important resource of a company. Evans (2003) pointed out that material resources decrease when used in the firm, while knowledge assets increase with use. Tiwana (2002) argued that technology, capital,

market share or product sources are easier to copy by other firms while knowledge is the only resource that is difficult to imitate.

The relational view of strategy entailsbusiness interactions, relationships and networks (Ahuja 2000; Gulati, Nohria, & Zaheer, 2000; Wang 2004; Walter, Ritter & Gemunden, 2001). An inter-organisational network involves relationships between two or more firms both in the micro-level and macro-level contexts (Wang 2014). The micro-level context involves resources flows, information flows and flows of mutual expectations between companies. The macro-level context includes institutional, relational, PESTEL factors (political, economic, social, technological, ecological, legal) and regional contingencies (Furrer, Thomas & Goussevskaia, 2008; Wang, 2014).

Methodology

The study employed a descriptive case study aiming for the sequence of interpersonal events analysis based on past information from 2017 to 2018. The case study attempts to discover the key phenomena on competitive positioning, investment, valuation and financial stability of companies. The advantage of this methodology is that results are focused and detailed, in which propositions and questions about a phenomenon are carefully scrutinized and articulated at the outset (Ekanem, 2010). An analysis of a case study can assist in understanding a larger class of similar units (Gerring, 2012). It can be used to determine the competitive strategies and the most accurate valuation methods (Babbie, 2010). There is massive amounts of information in a case study, but since the cases are so specific, this methodology is limited to generalization.

Results and discussion

Competitive positioning

The overall South African economy slipped into a technical recession in the first quarter of 2017 wherein it's Gross Domestic Product (GDP) declined by 0.7 % following a contraction of 0.3% in the fourth quarter 2016 (Stats SA, 2019). This contraction in economic activities affected various sectors in the economy including transport; manufacturing and real estate sectors of the

economy, thus most companies operating in these industries experienced declining annual turnovers. Moreover, in late December 2017, South Africa elected a president of the ruling party which changed the political game in South Africa, hence, also affecting the overall economy positively. The South African real macroeconomic variables showed substantial improvements including the strengthening of the exchange rate and bonds yield (SARB Quarterly Bulletin, 2018). This changeenhanced business confidence particularly those in investment, financial sectors and real variables including gross domestic product (GDP), household consumption expenditure (HCE), gross capital expenditure (GCE), gross fixed capital formation (GFCF) and gross domestic expenditure (GDE) among others showed growth potentials from 2017 to 2023. Because of this perceived growth potentials, business profitability for most companies registered in the JSE showed improvements in their financial reporting.

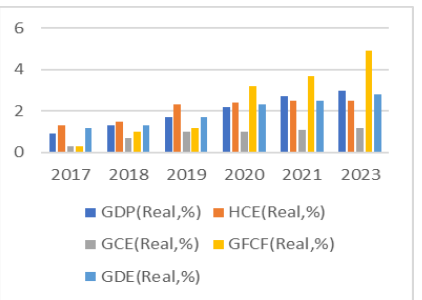


Figure 1. *South African macroeconomic outlook through selected macroeconomic variables*

The performance of various industries depends upon fluctuations in the global and domestic economic status quo. Amid fluctuations in the South African economy, massive growth in the Real Estate Investment trusts (REITs) had however been reported over the decade. PWC (2016), postulated that REITs companies account for over R230 billions of real estate Assets wherein their investments are mostly in commercial buildings such as office buildings, shopping malls, warehouses, and hotels. Nevertheless, property investmentperformance was affected by several drivers and is briefly identified as follows:

Economic factors: South African VAT increment in 2018 (from 14% to 15%) and soaring fuel prices constrained competition that makes it costly for companies to attract new clients and retain existing clients in the industry (Stats SA, 2019). The overall demand declined substantially making it difficult to be profitable in the industry. Companies in the industry were obliged to implement stringent strategies as a way of cementing their dominant positions and to gain a larger market share (Domanico, 2007).

Political factors: The South African political environment has been coarsely unsettled and business confidence as well started to exhibit decaying business confidence in most sectors of the economy. For example, property investment wherein lease terms have declined and also client retention was under immense pressure with negative growth rates across all sectors within which the company generates revenue (Business Tech, 2019). Moreover, the announcement of expropriation of land and the perceived outcomes of 2019 elections affected the performance of REITs companies. Despite this negative effect, the real estate industry continued to show strength as it was the largest influencer of economic growth in 2018 increasing by 1.8% during the year (Stats SA, 2019).

South Africa is believed to be a powerhouse in Africa and a home for most of the investors from all over the world as compared to other African countries particularly those found in the SADC region. Given this high base of foreign investors as well as domestic investors, most industries in the economy of South Africa are highly competitive thereby requiring companies to intensify their marking efforts to gain a larger market share. According to JSE (2019), South Africa is an investment destination for hundreds of Real investment Trusts. REITs companies offer investors exposure to real estate properties and mortgages through the JSE listed instrument. A volume of investors channeled their investment towards REITs companies particularly those investors who were eager to exploit returns in the property market without having to put large initial capital outlays. Thereby most property loan stock companies and property unit trusts listed in JSE have

been converting into REITs therefore further increasing the level of competition in the industry

Given this high level of competition in the industry, Company A remains one of the major dominant firms in the industry and among JSE listed companies. In terms of the top 40 index of biggest companies at JSE (2019) ranked by market capitalization, Company A has ranked within the first top 20 companies. Furthermore, based on our analysis of REITs listed, Company Ais one of the dominant companies with high market capitalization and Net Asset Value (NAV) as compared to its peers in the industry.

Due to the high turnover of companies operating in the property industry, particularly in South Africa and the ease with which companies can venture into this industry, there is a high possibility of increased competition for Company A in years to come. Given this expectation of high competition in the industry, we believe that the company will remain dominant in the industry. Company A has a formidable team of management that has vast experience and this together with the company strategy for the future will give the company a competitive edge over its competitors.

The other observed important factor is the good relation that company A has with its clients together with the communities within which the company operate. The company generated 56% of its revenue from its main and lasting clients from all three segments. Through corporate social responsibility programmes and ethical trading practice policy that the company has adopted, the company continued to build trusts with the society within the vicinity of its operation, which in turn helped the company to cement its competitive dominance in the industry. The company image was uplifted through these policies. Table 1 depicts the social responsibility projects provided by company A.

Table 1. *Social responsibility project*

	Aims and Objectives
Company A bursary programme	The project is designed to develop professionals within the property sector in order to ensure that the company has a pool of talent to select from for sustainability. When bursary students graduate they are eligible for Company A graduate training programme
Protec	This project aims to pursue science, technology, engineering

	and mathematics careers. The company has funded Protec first learner excellence programme in Limpopo 2018 financial year.
Staff volunteerism	The main objective of the project is to get its staff to get involved in the community-upliftment projects. The company staff is given eight hours to take part in volunteer initiatives throughout the year. So far, 126 staff have volunteered their time and have spent a total of 490 hours working with community's financial support.
Enterprise and supplier development	This project is aimed at developing sustainable small businesses by enabling access to market opportunities. Since 2008, this project has changed the small business landscape in South Africa's property sector and established an excellent record of accomplishment.
Early Childhood development project initiatives (ECD).	Company A partners with various organisations that provide safe environment for children to access education and nutrition as well as to ensure that ECD practitioners are skilled to give quality education to their learners.

Financial stability analysis

In the 2017 financial year, Company A realized revenue of R10716 million, which is a 9.75% increment from annual revenue of R9764 million in 2016 (Company A annual statement). However, the company made a revenue of R10976 million which is 2.4% growth in the 2018 year of assessment, meaning an increase at a declining rate from 9.75% to 2.4% of a worrisome – difference of 7.35%. Furthermore, another worrying factor about the group financial performance was a greater growth rate of property-related expenses of a 5.4% increase in 2018, which is greater than the increment in the company's gross revenue. In this regard, the company should look into cost minimizing strategies in their expenses. Table 2 provide changes of different financial ratios (profitability, liquidity, debt management, cash flow) from 2017 to 2018 for company A.

Profitability ratio: Return on capital employed declined from 7.11% in 2017 to 6.73% in 2018 and this indicates that the company has not efficiently employed its capital in 2018 as compared to 2017. The return on assets ratio also illustrates that Company A is generating a relatively small profit from the utilization of its assets. The operating profit margin ratio is also of greater importance because it illustrates the efficiency of management in managing operating expenses and ensuring greater revenue utilization (Rey

& Santelli, 2017). The company has been able to generate 87% of operating profit out of their net revenue in 2018 financial year signifying efficient management decisions regarding managing costs. Pre-tax profit ratio also shows higher profitability of 78% in the operation of the entity before considering the tax obligations.

Table 2. *Financial ratios (2017-2018)*

KEY FINANCIAL INDICATORS	VALUES	
	2018	2017
PROFITABILITY RATIOS		
Net operating profit margin on sales	74.35%	75.25%
Net profit margin	72.35%	78.54%
Return on capital employed (ROCE)	6.73%	7.11%
Return on assets	5.91%	6.38%
Return on equity	9.51%	10.73%
LIQUIDITY RATIOS		
Current ratio	2.93	1.58
Quick ratio	0.97	0.54
Cash ratio	0.74	0.19
DEBT MANAGEMENT RATIOS		
Debt to asset	39.46%	37.92%
Debt to equity	65.17%	61.08%
Time interest earned ratio	3.22 times	3.16 times
CASH FLOW RATIOS		
Cash flow to total debt	1.39%	1.43%

Liquidity ratio: Company A has favorable liquidity since its current ratio and quick ratio are above one signifying that the company is liquid enough to cover short-term commitments (Rey & Santelli, 2017). The company has about R2.93 of current assets that can be converted into cash to meet its short-term liabilities. However, both current and quick ratio shows that the company is liquid, and this reflects on the inefficient employment of working capital that could have otherwise invested thereby ensuring greater returns to the company.

Debt Ratio: Debt to asset ratio indicates that company A is less dependent on borrowed funds since its total liabilities are worth only 39% of its total assets. This implies that the entity does not face insolvency threats. The company that is too depended on borrowed funds will find its ability to raise revenue and to compete in the market limited by its creditors. Company A capitalization and debt-equity ratios indicate the stability of the

company's solvency stability. The capitalization ratio of the company shows that to support operations, the company is employing only 37% of borrowed funds. Debt equity ratio indicates that creditors had 67% money in the company but given the company asset worth, the entity still shows favorable debt risks in terms of meeting its financial commitments.

Cash flow ratio: If the company has insufficient cash flow from its operations, such a company runs the risk of being unable to meet its future financial obligations and may ultimately be forced to curtail or cease certain operations (Ali *et al.*, 2018). For this reason, analysis of a company's cash flow is a greater indicator of a company's financial stability. From the 2017 financial year, company A have realised improvement by a margin of 2.4%. However, accounts receivables increased by 13.41% which alarms that the increase in annual revenue may be mainly due to high volume in credit offering from the company. High volume in credit offerings has the potential risk of increasing bad debts, which may in turn harm cash flows in the company. The company only generated 14.87% of cash from its internal operations concerning the total debt it has incurred, and this reflects that the company is most likely to suffer from financial distress in the long run if this condition is to persist.

Company A shows high cash flow to the firm (FCFF) for both 2017 and 2018 financial years (Table 3). In 2017 the company had FCFF of R8 446 million while in 2018 FCFF declined by 6.59% to R7 924 million. The decline in FCFF was due to excessive increase tax expense in 2018, which negatively affected the net operating profit after tax, and the increase in net working capital from R85 in 2017 to R86 in 2018. Despite this decline of FCFF in 2018, the company still exhibit high stock value since the value of FCFF is still high indicating that the company has generated enough revenue to cover its costs and investment activities compared to their top competitors.

Table 3. *Free cash flow to the firm*

FCFF ITEMS	Value (Rand Amounts)	
	2018	2017
Net Operating Profit after Tax	7 905 000	8 447 000
ADD: Non-cash charges		

Amortization of intangible assets	99 000	99 000
Staff insurance scheme cost	33 000	34 000
Impairment of assets	20 000	-
LESS: Capex	(47 000)	(49 000)
LESS: Net working capital	(86 000)	(85 000)
TOTAL: FCFF	7 924 000	8 446 000

Financial ratios provide concrete insight into a company's operations however; the interpretation of ratios is normally based on subjective rather than an objective analysis of the analyst. To counteract the risks of analyzing company A, we employed two financial distress models called Zeta and 'Ray' models to classify company A as either financial distressed or financially sound (Altman, 2000).

The Zeta model is the modification and refinement of the Altman model and claimed to predict a company's financial distress with greater accuracy than the Original Altman model (Correia *et al.*, 2015) The results (Z" = 2.0307) of the Zeta model reveals that company A is classified as being in the grey or danger zone since 2.0307 lies between 1.10 and 2.60. According to this model, a company is considered to be financially sound if it has the Z" value 2.60 and greater whereas a company that obtains a value that is 1.10 or less is declared to be in the fail or distress zone (Altman, 2000). Zeta model is being implemented using the financial figures of the 2018 reporting period.

Dr. J.H. de la Ray of financial analysis has developed another financial distress model in South Africa (Correia *et al.*, 2015). This model simply classifies companies as either financially failed or financially sound. If the company obtains the value that is above zero, the company is considered financially sound and when the value is negative, it is said that the company is more likely to fail financially. Company A obtained -3.89 for the financial year ended 30 June 2018 and this value, as slightly different to the Zeta model, suggests that the company is in the failure zone.

Investment summary

Company Ais one of the market leaders in the property investment industry in South Africa and is currently expanding to a global scale. From our point of view, this companyhas the

potential of capturing greater market share from all three sector segments that it generates revenue from. This view is based on the solid relationship that the company has built over the years with its customers, communities and suppliers. Moreover, it is well-positioned to maintain its dominant power over its competitors by maintaining existing clients and attracting potential clients and thereby increasing greater returns to their investors.

Company A has outperformed its peers in the industry concerning revenue generation and value creation for their shareholders. From the company analysis, it has been established that it has positive and growing earning margins as well as favorable liquidity management (see table 2). The company has managed to meet its dividends obligations to its shareholders and is continuing to increase earnings. With earnings incremental and positive company outlook, we can attest that investors will be ready to pay the competitive recommended price per share of R2 669 to increase their ownership stakes in the company.

One of the company strategies for growth is to venture into the global property market. At the end of the 2018 financial year, company A had a book value of property assets of 27.7% and earnings before interest and tax 20.5% from the offshore market. The company further plans to increase value creation in the global market by increasing its stakes on Company A subsidiary to 29%, and by further expanding into countries through the acquisition of 65.5%. Company A has a positive outlook for the future and we believe that by increasing its ownership stakes abroad, the group will be able to strengthen its revenue streams and continue to increase investment attractiveness in the company.

Company A distributable income increased from 5.5 billion in 2017 financial year 6.1 billion in the 2018 year of assessment which is a 10.1% growth. The company's distributable income is essential because it is the total amount of income that the company has available after operating expenses have been detected. Thus, such an income is of greater importance to potential investors because it measures the capabilities of the company to declare meaningful dividends (Correia *et al.*, 2015). Moreover, in the 2018 financial year, the company distributed R208.6 cents per share (6.5% growth from 2017) to its shareholders, whichhigh as compared to the

dividend that is offered by the company peers. This increment in dividend per have boosted investment activities and is most likely to further solidify the company competitive position in the industry.

Investment risks

To ensure financial sustainability and market supremacy, Company A has devised various growth strategies for the 2019 financial year and beyond. These strategies includes internationalization through 68.4% acquisition of offshore shares and increasing ownership stakes to 65.5% in other branches abroad. The main risk associated with the internationalization of company A is exposure to foreign exchange fluctuations that might negatively affect the company earnings from the offshore market; Optimizing new revenue streams through a strong development pipeline of assets for third parties across all three sectors as a way of improving the company profit margins. The potential risks of increasing profit margins among others include high and intense competition. Therefore, Company A improvements may alert and entice existing competitors to intensifying their marketing effort to capture higher revenue. The efficient operation of any organization depends upon operational risks of the expertise and leadership qualities of the personnel of the organization (Atmojo, 2015). Company A has key staff that has vast experience in the industry. Losing key staff to competitors can potentially be an obstacle to the prosperity of the company and continued market dominance thus affect company investment activities negatively. For this reason, it becomes imperative that the company should ensure that it has a sustainable employee retention strategy in place to retain its key employees.

Valuation

The analysis of the company stock value revealed that Company A is limited with an estimated target price of R2 669 representing an upside of 9.02% from the closing price of R2 448 in June 2017 per share of June 30th, 2017 (see table 4). Since financial statements are prepared on an accrual basis and includes non-cash items such as amortization and depreciation, the company may

appear to be more or under profitable than it is. To ensure a precise analysis of the value of the company, table 4 presents valuation ratio analysis that is instrumental concerning theassessment of the company stock value (Correia *et al.*, 2015).

Table 4. *Valuation ratios (2017-2018)*

Financial analysis (ratio)	Values	
	2018	2017
Dividend yield	7.49%	7.32%
Earnings yield	6.10%	7.22%
Price-cash flow	11.68	9.55
PEG ratio	4.40	0.56
Market capitalization	78 billion	70 billion
Company market price (JSE)	R2 669	R2 448

Company A dividend yield performance has shown growth potentials for the 2018 financial year. Dividend yield grew from 7.32% to 7.49% while earnings yield, on the other hand, declined by 1.22% from 7.22% to 6.10%. These two price multiples are important for valuing company stock because they deliver important information to both existing and potential investors about the returns that will accrue to them by investing in the company (Correia *et al.*, 2015). Despite a decline in the company earnings yield from 2017 to 2018 financial years, Company A remains a lucrative investment destination for investors compared to its main competitors in the industry. The company has higher earnings yields as well as a dividend yield.

Moreover, the company earnings and dividend multiples as compared to 10-year South African Government Bond (SAGB) further support our buy recommendation on Company A stock. 10-year SAGB real yield has averaged between 3% and 4% in 2018 financial year, which is relatively fewer returns as compared to the yield that accrued to Company A investors by the deficit of almost 3.49%. The real yield of 10-year SAGB is informed by taking into account factors such as the country prevailing inflation rate, and a credit spread that quantifies the inherent risk in South Africa as an issuer among others (Correia *et al.*, 2015). Comparing the company dividend and earnings to 10-year SABG is convenient mainly because 10-year SABG is the maximum return that investors recoup from their investment with minimum risks (free-risk rate).

In addition to the analysis of the company dividend yield, we opted to utilize commonly accepted valuation price multiples which are then compared to the company peers in the industry. To perform a sound comparison in the industry the analysis is based on price multiples presented in table 4. From the 2017 financial year, Company A has realized a decline in its earnings per yield as in its price to cash flow ratio. On the other hand, the price per earnings to growth (PEG) showed a massive growth from 2017 to the 2018 year of assessment increasing by a margin of 3.84 percent. PEG ratio is more effective in determining the relative trade-off between the company price stock, the earnings generated per share and the company expected growth. For this reason, we have mainly used the PEG valuation metric to compare Company A with its major competitors in the industry. The company PEG ratio remains compatible as compared to the overall property industry PEG ratio that averaged 3% from 2016 to 2018 financial years (Table 4).

Financial shenanigans

With the high amount of reported fraud cases and the damages this causes to companies and investors, it becomes increasingly more important to detect such fraudulent activities. Accountants preparing information can manipulate the view of economic reality presented in such information to interested parties. These manipulations are regarded as morally reprehensible because they are not fair to users, they involve in an unjust exercise of power, and they tend to weaken the authority of accounting regulators (Cuzdriorean, Amat, & Vladu, 2017).

Table 5. *Summary of accounting gimmicks*

Accounting gimmick
Recording of revenue too soon
Recording of bogus revenue
Boosting income with one-time gains
Shifting current expenses to a later or earlier stage
Shifting future expenses to the current period as a special charge
Failing to record or improperly reducing liabilities
Shifting current revenue to a later period
Shifting future expenses to the current period as a special charge

There are several ways to detect accounting gimmicks and fraud in financial statements (table 5). Examples of these shenanigans are if a small-unknown firm audits financial statements for a large firm; if a firm's headquarter is reported to be in a different country than auditor; when an entity's performance in terms of ratios and growth in turnover is too perfect. To detect the possibility of the existence of financial shenanigans or fraud in Company A financial statements, a criterion in figure 2 has been used as a guide. Figure 2 provides a summary on how to read financial statements with the aim of checking whether a company has been involved in some accounting fraud.

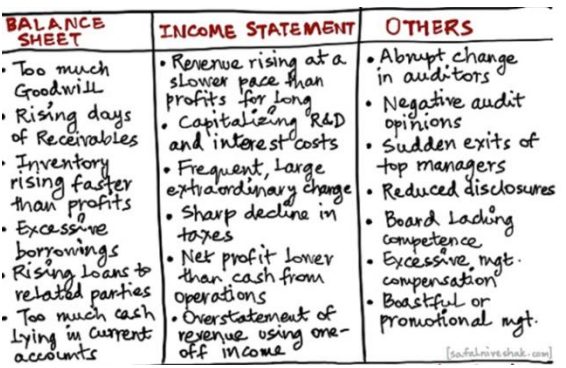
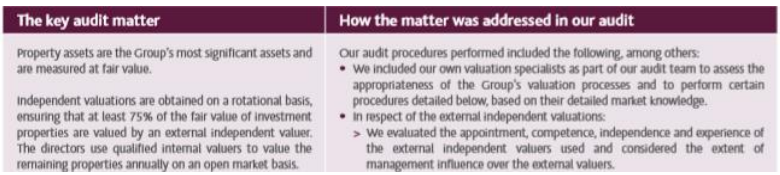


Figure 2. *How to detect financial shenanigans*
Source: www.safalniveshak.com, 2019.

Large firms need to be audited by a large audit firms such as "KPMG Inc" in South Africa as one of the four large auditors in the world (Big4accountingfirms). This reliable and credible company has audited the annual financial statements provided by Company A in compliance with section 30 of the Companies Act 2008 (dti, 2019). The choice of a credible audit company proves the company's willingness to detect accounting gimmicks on their financial statements. Figure 3 demonstrate a credible report received by Company A from a reliable audit firm.

Viewing independent auditor's report, Company A provided consolidated financial statements. Consolidated financial statements report the activities of the parent company and its subsidiaries in a single report, as if they were all a single company operating under one roof. Company A is a parent company to a

number of subsidiaries. International Financial Reporting Standards (IFRS) 10 requires all parent companies to present consolidated financial statements. However, if some details get lost during the consolidation process it can result in misleading presentation. Most public companies are required to report on a consolidated basis, but unconsolidated and segmented information must also be reported to ensure readers of the financial statements have all the relevant information.



The key audit matter	How the matter was addressed in our audit
Property assets are the Group's most significant assets and are measured at fair value. Independent valuations are obtained on a rotational basis, ensuring that at least 75% of the fair value of investment properties are valued by an external independent valuer. The directors use qualified internal valuers to value the remaining properties annually on an open market basis.	Our audit procedures performed included the following, among others: • We included our own valuation specialists as part of our audit team to assess the appropriateness of the Group's valuation processes and to perform certain procedures detailed below, based on their detailed market knowledge. • In respect of the external independent valuations: > We evaluated the appointment, competence, independence and experience of the external independent valuers used and considered the extent of management influence over the external valuers.

Figure 3. *Proof of Asset Valuation*

Firms practice financial shenanigans for various reasons. These include the need to raise capital at cheaper rates. This demands a firm to present a better report to credit rating agencies and lenders. Shenanigans can have huge paybacks like higher profits and performance-linked bonuses. Companies omit things to prevent negative outcomes. Omissions are made to dispel negative market perceptions especially during bull markets. Lastly, shenanigans are easy to do and it is unlikely that the wrongdoers will be caught.

Conclusion and recommendations

The study explored how a JSE listed company may be analyzed in equity research. This was carried out by exploring ways to asses' financial performance when presenting financial reports. This was done by analyzing the company competitive positioning, investment, valuation and financial stability. For this property market company, five financial analysis were essential, profitability ratio, liquidity ratio, debt ratio and cash flow ratio.

To this effect, the company was seen to be able to generate significant operating profits out of net revenue in 2018 financial year suggesting efficient management decisions regarding managing costs. This occurred while pre-tax profit ratio reflected higher profitability in the operation of the entity prior tax obligations. Reporting on the liquidity of the company it was

evident that it is liquid by observing both the current and quick ratios. Debt equity ratio indicated that creditors had significant money in the company but given the company asset worth, the company had favorable outcome proving that the company is able meet its debt risks in terms of meeting its financial commitments. An interesting finding was the use of the Zeta model in addition to the conventional cash flow ratio analysis to detect how stable the companies mightbe. As such, it is recommended that the Zeta model should be standardized in various equity researches to predict a company's financial distress with greater accuracy than the original Altman model. This can further be used to detect financial shenanigans or gimmicks with accuracy.

When providing valuations for property market it was essential to compare the companies' dividend yield with SA bonds. This is argued on the bases that the said sector was performing better even under harsh macroeconomic conditions in South Africa. Therefore, it is also recommended that property companies should be benchmarked against government securities. On that said note, one major investment risk was internationalization which leaves the main player in the market to exposure in foreign exchange fluctuations that might negatively affect the companies' earnings from the offshore market. This chapter has revealed the purpose of an equity research, that is, an insight and detailed analysis into companies used by investors to decide how to allocate their funds and by private equity firms and investment banks to value companies for mergers or Initial Public Offering (IPO). Additionally, it also explains to potential investor whether a company may be a buy or a sell in the equity share pricing.

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2 Energy, CO2s and water on the African Continent

Jan-Erik **Lane** [†]

Introduction

In the climate change process, the African countries suffer badly from the biggest externality in human history (Stern, 2007, 2015). They are not among the big emitters of greenhouse gases or CO2: s. But they have to adapt their societies and economies to temperature rise that will most probably go over + 2 degrees, and maybe even + 3 degrees. How to cope? If temperature raises goes even further towards + 4-6 degrees, life will be threatened. How can people work under too hot circumstances? Water? The wildlife?

Yet, African governments have promised to contribute towards the COP21 objectives of decarbonisation by transforming their energy systems. How to pay? Even if African nations carry out their responsibilities under the UN Treaty, there is no guarantee that the big emitters of CO2:s will not renege (Conka, 2015; Vogler,

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2016). And then we have the danger of the new methane emissions. There is a basic catch-22: The African continent uses less energy per capita than the other global continents, which entails that total emissions of CO2s are lower than in Asia, America and Europe. Yet, Africa badly needs more energy, as it is the capacity to do work that result in income and wealth (Sachs, 2015). If Africa could increase its energy share globally, it could reduce poverty and first and foremost secure its water supplies.

Energy on the continent

The countries on the African continent do not belong to the great polluters of CO2s in the world. Only a few of them have large CO2s like Egypt, Algeria, South Africa and Nigeria, but they do not rank among the really large 29 polluters in the world. This basic fact reflects their level of affluence, as energy and GDP are closely related. Consider Figure 1 with the global energy scene.

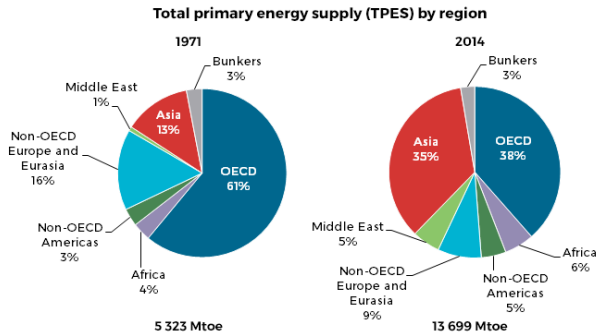

Figure 1. *Global energy*
Source: [Retrieved from].

It is small wonder that the African continent is the poorest, given its low share of global energy consumption. The population of Africa is increasing fast, meaning that much more energy is needed for economic and social development, but the COP21 decarbonisation project must be respected!

African countries are unique in the sense that they do not contribute much to climate change, but they could stand to suffer enormously from global warming – the external effects of climate

change. They range from excessive heat, constant need of air-conditioning (also augmenting emissions), droughts, ocean acidification, food shortages, and insupportable working conditions for peasants, etc. Yet, African governments can argue that they need much support for energy transformation, given the low share of global emissions for the continent – see Figure 2.

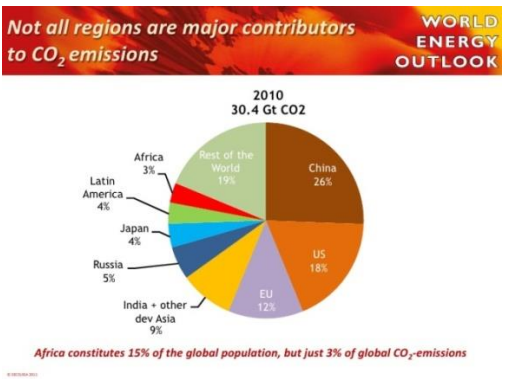

Figure 2. *Global emissions of CO2*
Source: [Retrieved from].

Economic development in poor countries as well as economic growth in advanced countries tends to trump environmentalism. This sets up the energy-emissions conundrum for mankind in this century: Affluence requires energy, as energy is the capacity to do work that renders income – see global Figure 3; but as energy consumption augments, so do emissions of GHG:s or CO2:s (Appendix 1). How to fundamentally transform global energy consumption?

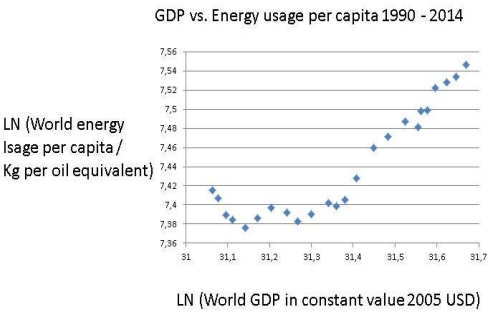

Figure 3. *GDP against energy per person (all countries)*

What is at stake for most people who understand the risks with climate change is not the *desirability* of decarbonisation in some form or another. They crux of the matter is *feasibility*: How to promote decarbonisation so that real life outcomes come about? The COP21 framework, and its three objectives, namely:

a) Halting the increase in carbon emission up to 2020 (Goal I),

b) Reducing CO2:s up until 2030 with 40 per cent (Goal II),

c) Achieve more less total decarbonisation until 2075 (Goal III),

will prove too demanding for most countries, I dare suggest - also for African nations in dire need of the promised Super Fund.

African governments must now start energy-emissions policy-making within the framework of the UN Convention on Climate Change. Positively, they can argue that energy consumption is far too low on the African continent. The population is rapidly growing and needs massive electricity supply. Simple global energy-emissions fairness requires this.

Negatively, African nations are much dependent upon coal - wood coal except South Africa that uses stone coal- and oil and gas in the oil producing countries and Egypt. Most African countries employ wood coal and its derivatives, which maintain the continent in poverty. The COP21 project should be used by African governments for rapid electrification by means of NEW renewables, like e.g solar power.

The energy-emissions conundrum applies also to the African continent, as CO2:sis rising, driven by economic development. The situation in 1990 for 13 major African countries was as depicted in Figure 4.

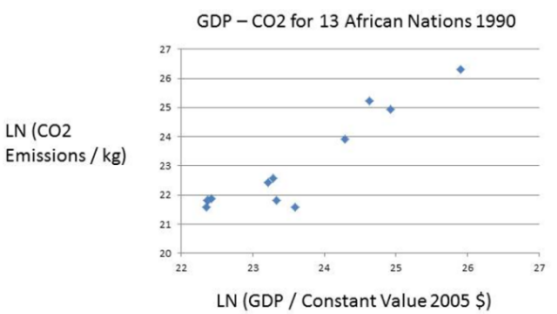

Figure 4. *GDP-CO2 link in 1990: y = 1,34x; R² = 0,87*

20 years later, emissions have increased following economic development. Surely, the UN would be interested in seeing CO2:s low in Africa, but then it must help with a fundamental energy transition from solids and fossil fuels to NEW renewables. (Figure 5).

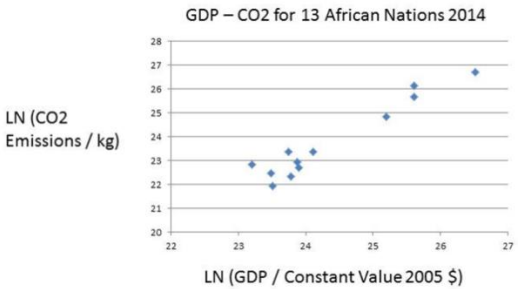

Figure 5. *GDP-CO2 link 2014: y = 1,47x; R^2 = 0,93*

Water supply in Africa

Environmental policy-making and implementation is inherently about politics, from its start to the finish, if it exists. Governments, national, regional and local have the responsibility for the environments and it may find partners – communities, civil society and business – in the policy cycle relating to ecology issues. Coordination failure is often occurring due to myopia, opportunism and conflicts between states or governments in a country.

Environmental degradation is to be found for most lakes and rivers around the globe. But the extent of damage varies tremendously. What are often harmful for lakes and rivers are the construction dams for electricity generation.

The key question in relation to the degradation of lakes and rivers is: Will they shrink dramatically? Global warming and human exploitation work together to diminish lakes and rivers around the world, in several spectacular cases also on the African continent.

The most spectacular case of lake shrinking or disappearing today is Lake Chad in the centre of Sahara. It is now 1/5th of its size in 1970, when a public investigation and control mechanism was launched by the five neighbouring countries, to no avail. The lake is now only 7 meters deep and will disappear soon. The

reason: human overuse for drinkable water and irrigation. Outcome: Population movements, or environmental refugees in politically instable countries.

The River Nile is loosening water due to the construction of several dams in Ethiopia and Sudan. Egypt has expressed concern for its water supply in the near future, but there is no formal intergovernmental regulation of this water conflict. The mighty Nile will soon no longer be so powerful, as the water flow from both the White and Blue Nile diminishes due to dams as well as the Mediterranean Sea eats into its delta with inflowing salt water. Outcome: increased water scarcity in Egypt with food shortages; severe political conflict between Egypt, Ethiopia and Sudan; more electricity for Ethiopia and Sudan.

In Africa, one may also wish to mention the river Niger and the Lake Victoria, when speaking of ecological disasters in the future. Both are deteriorating, Niger River due to dams and Lake Victoria due to human exploitation and global warming.

The situation is hardly much better in other parts of Africa: lakes are under deterioration because of human activities on the one hand – overfishing, waste and sewage disposal, and take out of water for various purposes – as well as global warming on the other hand; rivers increasingly come under pressure from dam construction, sewage and waste, as well as water take outs.This negative evaluation holds for among others the large lakes of Lake Malawi and Lake Tanganyika as well as for great rivers like The Congo, The Chobe, the Zambezi, etc. The River Congo has to cope with logging in addition to human pollution. Thus, legal or illegal harvest of the rain forest in the huge Congo Basin opens up roads that may be used for further exploitation.

Given the predicament of rivers and lakes in Africa, one may predict a shortage of fresh, clean, drinkable water soon with negative repercussions for food.

African energy

It cannot be more strongly underlined that energy patterns of consumption vary enormously on the African continent, which has clear policy implications. What has not been recognized is the several countries rely upon old renewables, which pollute. Below I

make a short overview of the energy-emission situation in a few major African countries, drawing upon official statistics and refraining from speaking about all the hopes and plan, yet to be fulfilled.

Coal Dependency: RSA

The RSA has a modern economy running on mainly coal. In transportation, it uses petroleum. This makes the RSA a major polluting nation. It wants to spread electricity to all shanti-towns, but with what energy source? Figure 6 substantiates the basic point that economic development needs lots of energy all the time.

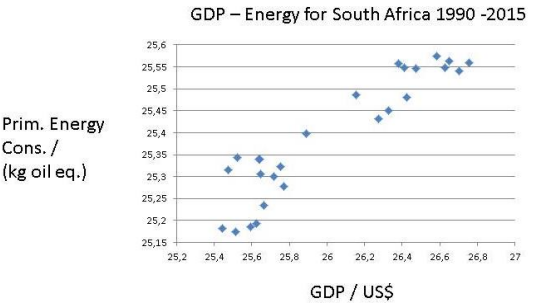

Figure 6. *GDP and energy in RSA: y = 0,28x; R² = 0,86*

As the RSA wishes to promote socio-economic development in the coming decades, it must increase the access to energy. High rates of economic growth are necessary for poverty reduction, which requires more energy. But energy consumption patterns in urban and rural sited in RSA are based on fossil fuels – see Figure 7.

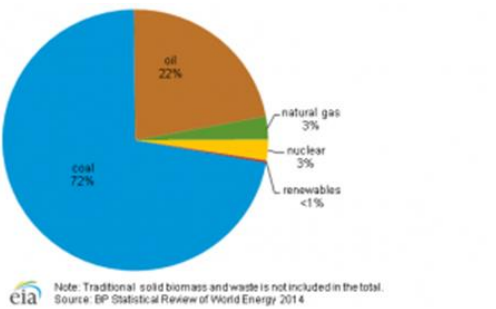

Figure 7. *Energy consumption in RSA*

The question is whether the present government with its weak economy has the determination to turn to renewables or nuclear quickly. Figure 8 displays the standard picture of more economic output – more CO2:s.

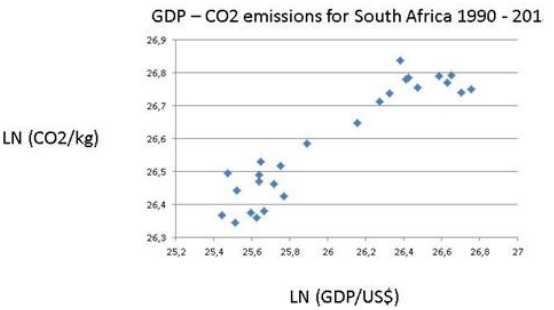

Figure 8. *GDP and emissions 1990-2015: y = 0,35x; R² = 0,88*

The RSA may not have the policy know how or preferences and motivation to cut the coal consumption fast as well as radically and move to solar energy, for instance? Or would the RSA renege on COP21 – the always available option in collective action endeavours?! South Africa needs the Super Fund and a major change in government policy priorities.

Oil Dependency: Algeria

Some African countries produce lots of oil and consume some of it themselves. One country almost only relies upon oil and gas.

Algeria

Algeria is a major exporter of natural gas and oil. Thus, we expect that it relies exclusively on fossil fuels, like Mexico, Iran and the Gulf States. Figure 9 verifies this expectation.

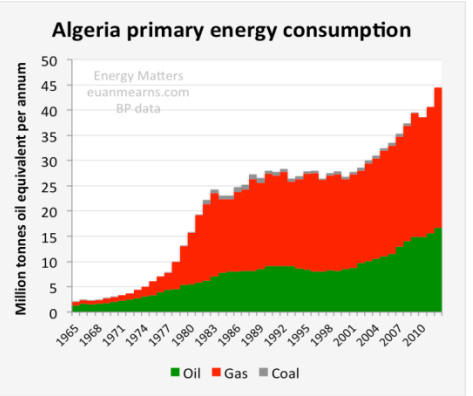

Figure 9. *Energy mix in Algeria*
Source: [Retrieved from].

Although Algeria may have great trust in the availability of future fossil fuels resources in the country, it still faces the demand for a 30-40% reduction of its CO2 emissions from the COP21. Emissions have thus far followed the economic progress very closely– see Figure 10.

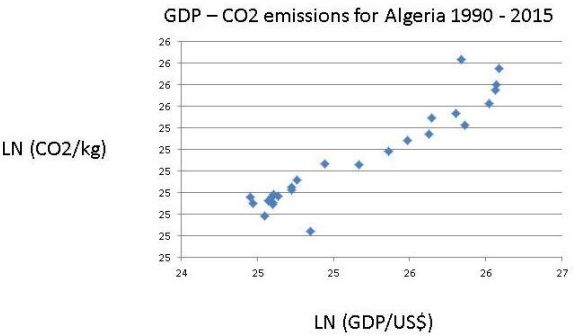

Figure 10. *GDP-CO2 in Algeria: y = 0,81x; R^2 = 0,93*

The truth is that Algeria pollutes heavily. It is of course the need for energy that drives the augmentation in CO2:s. Figure 11 documents the GDP-energy link.

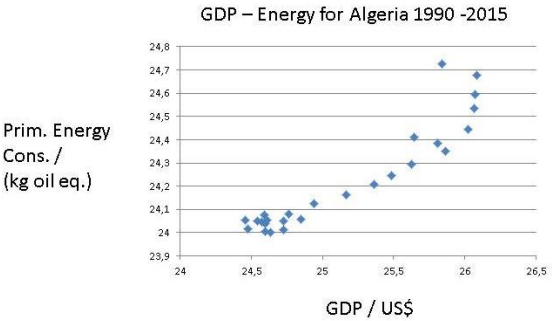

Figure 11. *GDP and energy: y = 0,35x; R² = 0, 87*

One would naturally suggest solar energy as a viable alternative to the heavy dependence upon fossil fuels in Algeria, given its immense Saharan territory. Yet, Algeria has been plagued by the attacks of terrorists or looters. But solar energy from Sahara would be very interesting for the EU.

Gas Dependency: Egypt

Egypt has a huge population with high unemployment and mass poverty, besides a high level of political instability, resulting from religious conflicts. But surely it has electricity from its giant Assuan dam and the Nile? No, hydro does not count for much for Egypt, where most people live in the Nile delta. CO2:s are on a sharp upward trend for Egypt, because it relies mainly upon fossil fuels, like gas and petrol.

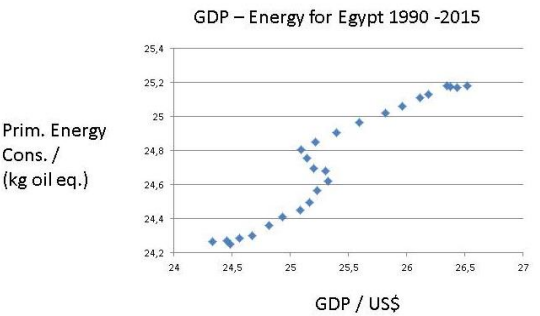

Figure 12. *Energy and GDP in Egypt: y = 0,4881x; R² = 0,9069*

Egypt relies upon huge gas assets in the south, exporting a lot. But its petroleum resources are dwindling. Egypt will have 100

million people, crammed in the Nile delta. It needs much more energy to uplift its population. CO2:s follow economic development in Egypt, as elsewhere – see Figure 13.

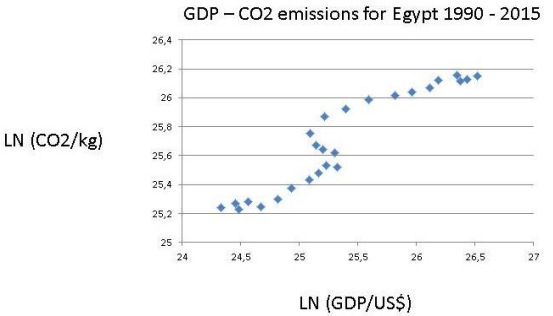

Figure 13. *GDP-CO2 for Egypt: y = 1,02x; R² = 0,99*

It will be very difficult for Egypt to make the COP21 transformation, at least without massive external support. But where to build huge solar power plants in a country with terrorism, threat or actual? The share of hydro power is stunning low for a country with one of the largest rivers in the world. Actually, the water of the Nile is the source of interstate confrontation between Egypt, Sudan and Ethiopia, because the latter two have started to exploit it recently on a large scale.

As Egypt relies almost completely upon fossil fuels, it has massive CO2 emissions (Figure 14).

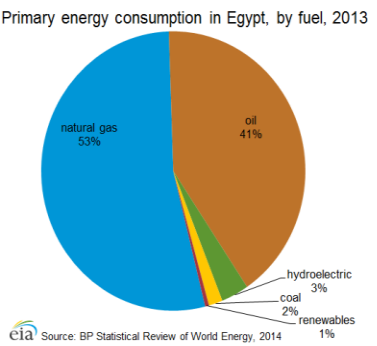

Figure 14. *Egypt's energy mix*

Egypt has made progress with wind energy, but its economy is too weak for the COP21 transformation, as the country is dependent upon US support yearly.

Dependency on Oil and Biomass

An enormous reliance upon traditional renewables is to be found also in Africa, like in e.g. Angola and Nigeria, although both have access to massive fossil fuels: oil and gas. Figure 15 describes the energy mix for Angola.

Angola

This country has quite substantial CO2 emissions that follow economic development, as usual – see Figure 15.

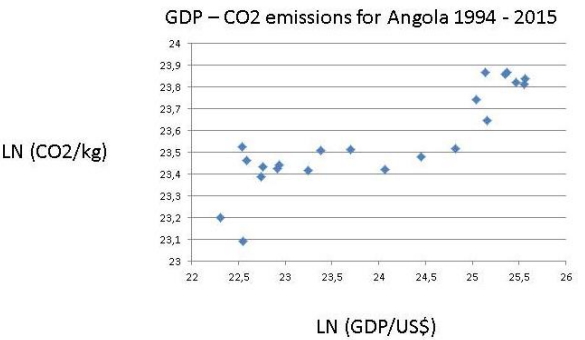

Figure 15. *GDP and CO2: s for Angola: y = 0,16x; R² = 0, 75*

One would be inclined to surmise that the explanation of the upward curve in Figure 15 is the consumption of oil. Angola has become a major petrol exporter, to the benefit of the ruling family. However, the country also employs wood coal in large quantities that are very polluting (Figure 16).

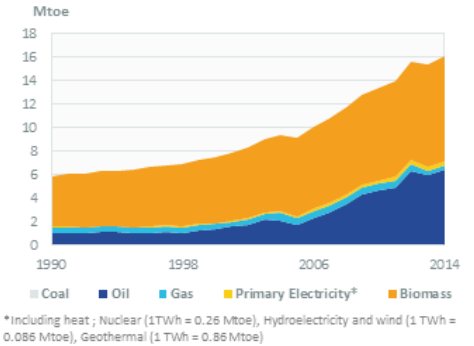

Figure 16. *Angola's energy mix*

Angola has suffered from long and terrible civil war. In the many poor villages, energy comes from wood, charcoal and dung – all with negative environmental consequences. Angola has immense fossil fuels – oil and gas, but the political elite family with a Marxist background prefers to export much of these resources instead of using them for internal electricity generation.

Nigeria

Surprisingly, Nigeria relies much upon traditional renewables, reflecting the poverty of the country. Yet, also wood coal emits CO2:s. This, Nigeria pollutes much totally, although not per capita. Figure 17 shows a somewhat erratic trend that is upward

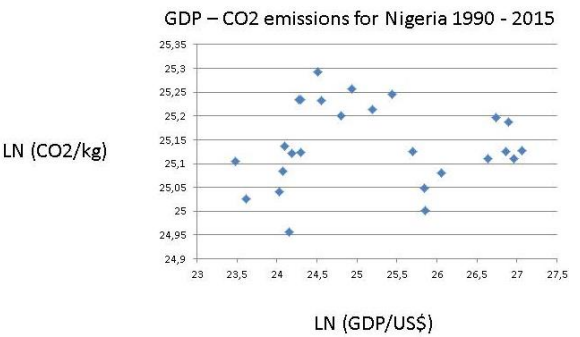

Figure 17. *Nigeria: GDP-CO2 link:y = 0,0032x; R² = 0,0018*

Giant Nigeria has a resembling energy mix as Angola, with lots of biomass – see Figure 18.

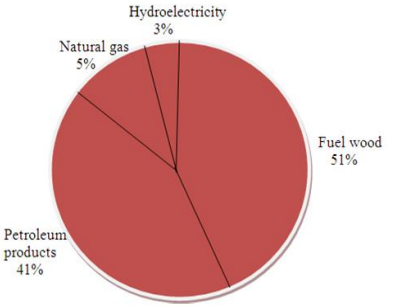

Figure 18. *Nigeria's energy consumption*
Source: Sustainable Energy, 2013 1 (2), pp. 14-25.

As a matter of fact, wood coal is as polluting as stone coal, and worse than oil and gas. Nigeria is a country with deep environmental problems and definitely in need of foreign assistance. Besides the oil spills, the risks of global warming are tremendous, with droughts, etc.

Gabon

Another very telling example is Gabon, where Chinese exploitation cuts down the precious forest, funding the buying streak of the ruling clan, including property in France (Figure 19).

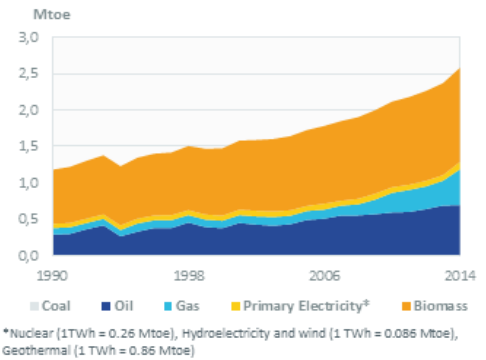

Figure 19. *Energy consumption in Gabon*
Source: [Retrieved from].

Despite its big oil and gas resources, much of the poor population relies upon biomass, i.e. wood coal with its consequences for deforestation and desertification.

Oil and Coal Dependency

Morocco

Despite the enormous success of its huge solar panel plant at *Quarzazate*, Morocco remains much dependent upon imports of fossil fuels - see Figure 20.

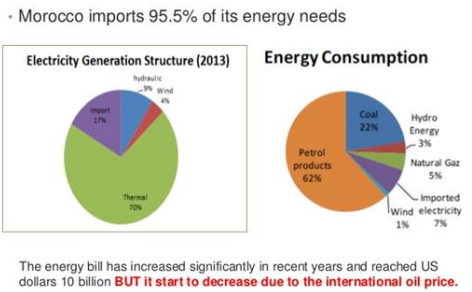

Figure 20. *Energy mix in Morocco*
Source: [Retrieved from].

In order to reduce fossil fuel dependency in the century, Morocco with a rapidly growing population will need more similar plants, which presupposes that assistance will be forthcoming from the COP21 project. Actually, the CO2:s are substantial in this nation. Its solar plant is a model for the entire Sahara, but this huge desert area needs political stability, lacking in several Saharan countries.

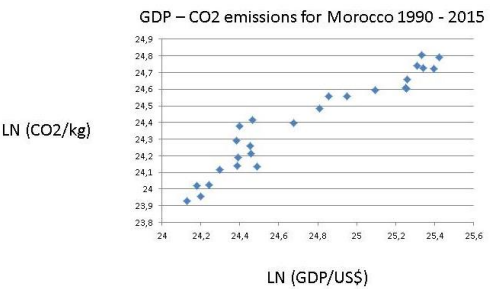

Figure 21. *GDP and emissions in Morocco: y = 0,59x; R² = 0, 91*

Botswana

African countries have sometimes both a traditional and a modern economy. Take the case of Botswana, a democracy with a

market economy and traditional chiefs! It has considerable CO2:s despite a rather small population – see Figure 22.

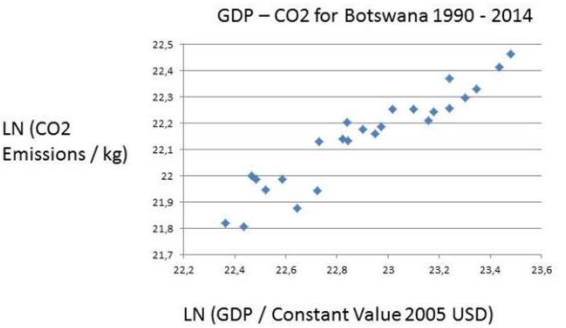

Figure 22. *Botswana: GDP-CO2:y = 0,51x; R² = 0,89*

Yet, Botswana relies mainly upon fossil fuels, oil and coal, to deliver its economic output from mining and minerals (Figure 23).

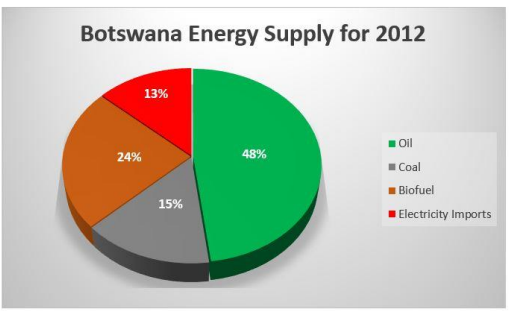

Figure 23. *Energy consumption in Botswana*

Complying with the CO2 objectives, Botswana can use solar power to diminish the scope of fossil fuels or that of traditional renewables. Botswana has peace, which is extremely important for energy policy-making.

Wood Coal Dependency with some Hydro Power

In the climate change discussions and policy-making, it is often stated that renewables should be preferred over non-renewables. Yet, this statement must be strictly modified, as there are two fundamentally different renewables:

- Traditional renewables: wood, charcoal and dung. They are not carbon neutral. On the contrary, employing these renewables results in severe pollution, not only outside but also inside household;
- New renewables: solar, wind, geo-thermal and wave energy that are indeed carbon neutral, at least at the stage of functioning.

In the poor African countries with about half the population in agriculture and small villages, traditional renewables constitute the major source of energy.

Kongo Kinshasa

One understands the hefty use of wood coal in this giant country, so plagued by political instability, anarchy, anomie and civil wars with foreign involvement (Figure 24).

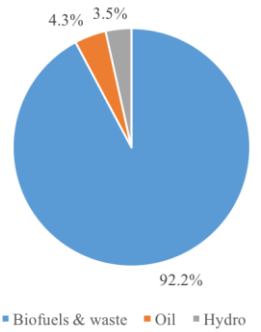

Figure 24. *Dr Kongo's energy mix*
Source: Democratic Republic of Congo - Energy Outlook, Kungliga Tekniska Hoegskolan

One notes how little of hydro power has been turned into electricity in Kongo, but economic development and political instability, civil war and anarchy do not go together normally. At the same, one may argue that an extensive build-up of hydro power stations would pose a severe challenge to the fragile environment in the centre of Africa. Kongo can now move directly to modern renewables like solar power.

Sudan

The energy consumption of Sudan reflects this situation – Figure 15. The countries relying upon traditional renewables to an extent up to 50 per cent or higher will have to reflect upon how to

bring these figures down sharply with modern renewables. It is an entirely different task than that of countries with too much fossil fuel dependency. Hydro power has increased in Sudan, which is a positive. But the water of the Nile can last only so long for three energy power hungry nations.

Sudan is dismally poor with deep-seated internal conflicts ethnically. How to move to large solar panel plats in a country with so much political instability resulting huge numbers of death from domestic violence? Figure 25 shows the energy mix before the split up of this huge country.

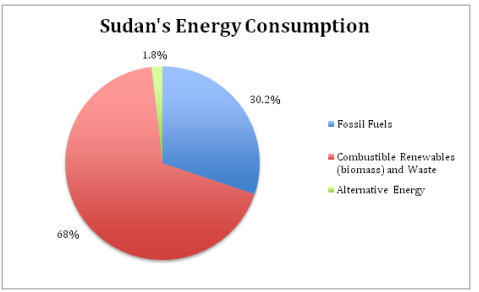

Figure 25. *Sudan's energy mix*
Source: [Retrieved from].

Ethiopia

The reliance upon traditional renewables is so high in neighbouring Ethiopia that electrification must be very difficult to accomplish over the large land area. Figure 26 displays a unique predicament, although a few hydro power stations have increased hydro power substantially since 2008.

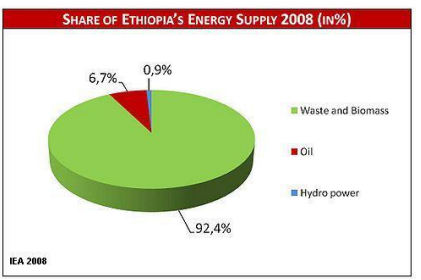

Figure 26. *Ethiopia's energy mix*

Are there any advantages with such a skewed energy mix? No, because even mainly rural Ethiopia delivers with lots of CO2: - see Figure 27.

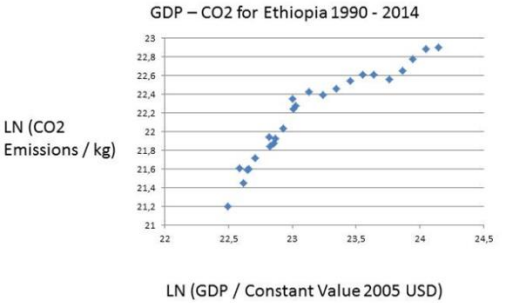

Figure 27. *Ethiopia: GDP and CO2:y = 0,90x; R² = 0,88*

The zest with which Ethiopia is pursuing its control over water resources becomes fully understandable, when Figure 26 is consulted. What we see is the same smooth linear function plotting CO2:s upon GDP, as is obvious in countries based upon fossil fuels – see below. For Ethiopia, to comply with COP21 goals is going to pose major challenges, especially if economic development is not going to be reduced. The country needs massive help, both financially and technologically.

The Grand Ethiopian Renaissance Dam in Ethiopia and the Merowe Dam in Sudan bring electricity to Africa. Hydro power could be much more exploited in several African countries, but time is running out. Global warming reduces rivers and enhances draughts. Solar power is the future for all nations, whatever pattern of energy consumption they now have.

Ghana

One of the promising nations in Africa is Ghana, housing both democracy and positive economic development. Figure 28 shows its GDP-CO2 picture for the last two decades, when things have gone well and peacefully.

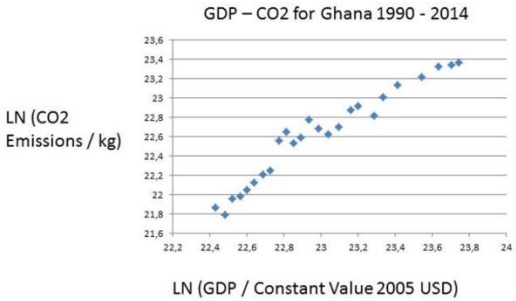

Figure 28. *Ghana: GDP-CO2: y = 1,17x; R² = 0,94*

There is a very strong connection between GDP and CO2 emissions in Ghana. One would like to examine its energy mix in order to understand this. Figure 29 presents the energy consumption pattern in Ghana.

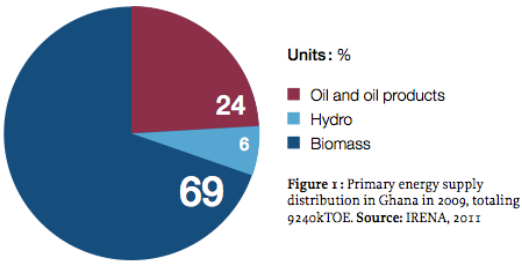

Figure 29. *Ghana's energy mix*
Source: [Retrieved from].

The dominance for fossil fuels and wood coal is enormous in Ghana, but they have hydro energy, which is very positive. Many African could have done much more with hydro power, if they had had access to capital. Now they must turn to new renewables: solar, wind and geo-thermal power. The same observation applies to East Africa.

Deforestation

The East African region of African continent has become more economically dynamic recently with successful regional integration. Yet, the reliance upon biomass is as Figure 30 shows typical of rural East African countries. As some 50 per cent of the

inhabitants live in rural villages, this use of wood coal puts an enormous pressure on the forests.

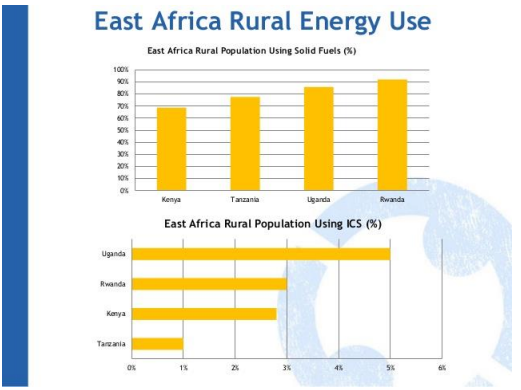

Figure 30. *Energy mix in rural East Africa*

People in the urban areas have an entirely different energy consumption pattern. Positively, hydro power is important in these countries – see Figure 31. Here we are talking about electricity consumption and not overall energy mix.

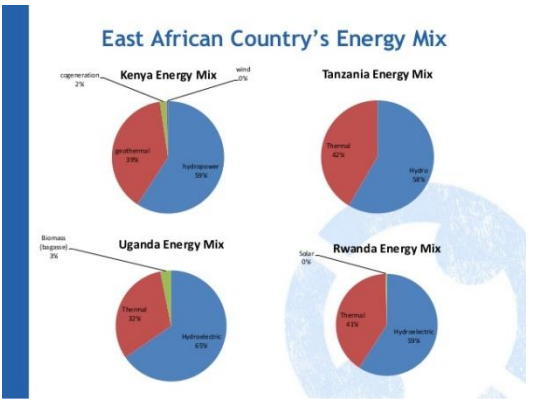

Figure 31. *Hydro power in East Africa*

What these countries need to is to replace the wood coal with electricity from hydro and geo-thermal resources. The status of biomass or wood coal from the point of view of GHG:s is contested. On the one hand, it is clear that wood coal in its various forms is not carbon neutral when consumed, but on the other hand

it is claimed that wood products have already consumed lots of carbon when growing. Whatever, the balance may be, the forests are being cut down, contributing to deforestations and desertification. In Figure 32, we see that CO2:s follow GDP in Kenya, a strongly developing country in East Africa, relying upon the market. Thus, also Kenya will face difficulties complying with the COP21 goals: Goal I, Goal II and Goal III – see above.

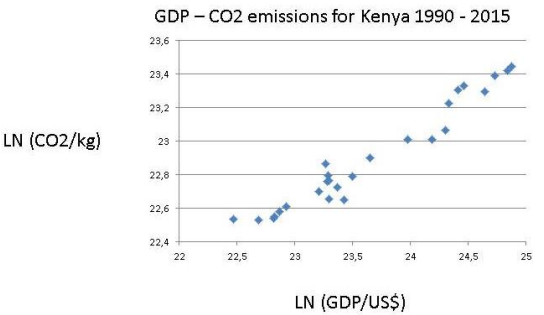

Figure 32. *GDP - emissions for Kenya: y = 0,42x; R² = 0, 95*

The GDP-CO2 curve for Kenya is the same as for most African countries, meaning upward sloping. Africa needs energy as well as basic energy transformation – an enormous challenge.

Zambia, Mozambique and Senegal, Cameroon

The same picture of an energy mix dominated by wood cool is to be found for several other African nations. Biomass counts for 50 per cent of more of total energy consumption, complemented by not more than 10 per cent hydro power while the remaining comes from fossil fuels. This puts too much pressure on African forests. And there will be massive CO2 emissions, because these wood resources are never replaced. The road ahead is not more fossil fuels, but modern renewables like solar, wind and geo-thermal power replacing wood coal and its derivatives. We quote from the *UN Convention to Combat Desertification*:

Two-thirds of the African continent is desert or dry lands. This land is vital for agriculture and food production, however nearly three-fourths of it is estimated to be degraded to varying degrees. The region is affected by frequent and severe droughts, which have been particularly severe in recent years in the Horn of Africa and the Sahel. Poverty and difficult socio-economic

conditions are widespread, and as a result many people are dependent on natural resources for their livelihoods. For many African countries, fighting land degradation and desertification and mitigating the effects of drought are prerequisites for economic growth and social progress. Increasing sustainable land management and building resilience to drought in Africa can have profound positive impacts that reach from the local to the global level [Retrieved from].

Before desertification often comes deforestation. It is often stated that land hunger drives deforestation. But equally relevant is the search for energy. We quote from a study: Forests in Zambia are important in supporting life especially in low-income communities both in urban and rural areas. A variety of wood and non-wood forest products are utilised by industries, rural households and urban households in various parts of the country. However, today the forests in the country have been made vulnerable to both man and natural induced disasters. The rate at which forest cover is being lost has increasingly become high such that if this trend is left unchecked time may trigger the complete loss of biodiversity embodied in the Zambian forests. Perhaps the highest loss of forest cover was from 1990 to 2000 with a significant decline of 851,000 ha forest loss per year (FAO 2001). Deforestation as a result of land use change towards agriculture, illegal settlements and Current unsustainable levels of utilisation to mention but a few have contributed to the loss of forest cover in Zambia and the Southern Africa as a whole. The critical question seeking urgent redress is why forests in Zambia are being destroyed more and more [Retrieved from].

Conclusion

African nations may rightfully claim a fair share of the energy consumption in the word, meaning in proportion to its share of global people. The catch-22 problematic is that African governments have signed the decarbonisation Treaty of the UN and must now proceed to implement it, but how to increase energy while decreasing CO2 emissions? Answer: Use renewables like solar, wind and geo-thermal power! Nuclear power is probably too expensive and difficult to master. Morocco has set up the largest

solar power plant in the world, serving some 2 million inhabitants with electricity. Several hundred millions of Africans are without safe and secure electricity, holding back socio-economic development. But such gigantic investments are only feasible with massive support from the promised Super Fund in the COP21 project.

Poverty and especially water shortage on the African continent reflects the energy situation. Yet, as African nations increase energy, they must at the same time reduce CO2: s. The COP project is a great opportunity for African peoples, but the promise of support must be forthcoming. New energy must be directed to secure water resources, construct sewage plants, halt overfishing and safeguard access to potable water. The use of wood coal in connection with deforestation is very bad.

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3 Financing the long-term and medium-term needs of SMEs in Cameroon: A contextualization of the rule of minimum financial equilibrium

Noé **Ndjeck** †

Introduction

Funding SMEs in general, especially long-term and medium-term needs (LTMTN), is still a relevant issue in sub-Saharan Africa and particularly in Cameroon (Ndjeck, 2016, p.3). Despite the creationof the Ministry of SMEs and the SMEs' Bank after the Development Bank (BCD) and the Guarantee Fund for Small and Medium-sized Enterprises (FOGAPE) had disappeared, SMEsprimary problemremains funding; especially long-term and medium-term funding. In 2000 a survey of a sample of SMEs conducted by the Centre for Research, Studies and Polling (CRETES) showed that the funding needs of SMEs, all branches included, were estimated at 68% for investment and 32% for the operating cycle. Another survey in 2002 by the same Centre covering 300 SMEs in the productive sector revealed that SMEs

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financial needs are on average 81.83 million FCFA per SME compared to 79.51 million FCFA in 2000, an average increase of 30% per SME (CRETES, "economic situation", No.22, February 2003, p.72); 72% of Cameroonian SMEs have difficulties acquiring capital to invest, 14% do not even dare to introduce an application for a bank credit as they areconvinced that the funding will not be granted, and 14% benefit from the credits thanks to strictly personal relationships (Beyina, 2008, p.10).

A study conducted on 452 SMEs in Cameroon, all branches included, by Ndjeck (2016) found out that 249 SMEs (or 55.1%) in the sample could not benefit from bank funding. Out of the 199 (44.02%) that benefited from bank funding, 43 SMEs were unable to obtain the creditrequested.

The SMEs' Bankwhich grants loans at a slightly lower rate seems to be having difficulty today in fulfilling the missions assigned to it, mainly because of lack of funding resources.

In addition, our banking systemis only made up of commercial banks with short-term resources that have the natural vocation of lending in the short term (Dinamona-Loukoumba, 2001). It is true thatbanks can transform short-term resources into long-term ones. But this transformation does not occur without risk. It exposes the bank to immobilization risk (Um-Ngouem, 1997, Bessis, 1997).

The short-term character of deposits made by savers appeared after the severe economic crisis that broke out in Cameroon in the 1980s (Touna Mama, 2008). Savers saw their deposits vanish as banks close down. This disappearance caused a psychosis and led them to henceforth keep their savings in the banks for only a short time. Indeed, there is today a trust crisis between banks and SMEs. Banks have been evolving in insecurity since the events experienced in the 1980s. This insecurity on the part of savers causes them either to be reluctant to deposit their funds with banking institutions or to give their funds a short stay in banks (Ondo-Ossa, 2002). This psychosis has also reinforced informal funding circuits (ROSCA) and the proliferation of microfinance institutions (Pony, 2013, MbouobouoNdam, 2007, Ngongang & Wandji, 2002, Bekolo-Ebe, 1993).

The recent economic crisis hascaused many consequences: the disappearance of many banks including the Cameroonian

Development Bank (BCD), the restructuring of thebanking sector, the disappearance of long and medium-term deposits and the retraction of money supply. It has further aggravated the rationing of bank loans for SMEs. As a consequence of the rationing of bank loans, SMEs are moving towards alternative funding sources, especially ROSCAs and microfinance institutions (Tchouassi & Ndjanyou, 2002, Essomba-Ambassa, 1990, Um-Ngouem, 1997, Ngongang & Wandji, 2002, Mayoukou, 1996, 2000, 2008).

Alternative funding, including ROSCA and microfinance institutions, which are characterized by the short-term resources used by SMEs, raises the following questions:

- What can finance the long-term and medium-term needs of SMEs?

- How do SMEs manage to ensure the rule of minimum financial balance?

The rest of this work will consist in highlighting respectively:

- SMEs sources of funding in Cameroon on the one hand and the long-term and medium-term needs of SMEs in Cameroon on the other hand;

- The contextualization of the rule of minimum financial equilibrium;

- The orientation of SMEs in covering their needs in the medium and long term.

The sources of financing of SMEs' LTMTN in Cameroon

Companies use several funding resourcesto meet their needs. These resources come from two sources. The origin can be internal or external. These resources can be classified into four categories:

- stable resources and circulating resources;

- own funds and debts;

- internal resources and external resources;

- Formal resources and informal resources.

Stable resources are those which remain at the disposal of the company for a duration greater than two years. However, in terms of accounting, any resource with a duration of more than one year is a stable resource. Circulating resources stay in the company for a maximum of two years. In accounting terms, up to one year, the

resource is considered short-term. For the purpose of this study we shall retain the accounting definition.

Own funds consist of resources created by the company itself and funds contributed by individual partners or entrepreneurs. Debts are just the opposite of own funds because they are resources from third parties other than individual partners or entrepreneurs.

Internal resources are part of own funds and are created by the company. This is the case of the self-financing capacity. External resources are those provided by anyone other than the company itself. They come from outside its production circuit.

Formal resources come from organized, regulated and controlled bodies. This is not the case with informal resources beyond the control and regulation of public authorities. However, bodies that own these informal resources are organized privately.

In this study we shall adopt the formal and informal fundingof SMEs classification in Cameroon.

The formal funding of SMEs'LTMTN in Cameroon

Formal funding consists of internal resources, banks, leasing, venture capital companies, contributions by individual partners or operators, microfinance institutions and business-to-business credit. But bank financing will not be developed here becauseSMEs are overly victim of bank credit rationing (Joseph, 1993, Taka, 2010, Ndjeck, 2016, p.7).

The permanent formal funding of SMEs'LTMTN in Cameroon

The permanent funding of SMEs in Cameroon brings together all conventional stable financing resources other than banking (banks in Cameroon rarely fund long-term needs).

A study conducted by Ndjeck (2016) on SMEs victims of bank credit rationing to cover long-term and medium-term needs led to the following conclusions:

- 20 out of 249 SMEs (8.03%) proceed with the capital increase;
- 25 out of 249 SMEs (10.04%) go to leasing institutions;
- 4 out of 249 SMEs (ie 1.60%) turn to venture capital companies;
- 12 out of 249 SMEs (ie 4.81%) sell part of their fixed assets.

Capital increase, leasing institutions, venture capital and disposals of fixed assets constitute the permanent fundingthat enables to meet the long-term and medium-term needs of SMEs in Cameroon. Leasing institutions are top of the list followed by capital increase.

Leasing institutions are more favorable to funding SMEs as the initial contribution to the project is not required and, on the other hand, the only guarantee provided is the leased property. Funding procedures here are also simpler than in the case of a bank loan. However, more and more, leasing institutions are carrying out the same risk analyzes as banks (Depallens & Jobard, 1990, p.737). Similarly, they sometimes require a deposit fromthe company which is not refunded until the end of the lease (financial guarantee) (Charreaux, 1991, p.541). This reduces the possibilities offunding SMEs by this means.

The capital increase that follows leasing institutions, and which is less indicated in the hierarchical financing theory (Myers & Majluf, 1984), is justified by the low level of internal funding available to SMEs in Cameroon. Their financial capacity is fragile (Edding, 2002). This funding method has the advantage of and offers the possibility to remain at the disposal of the company until the end of its life. However, it is regrettable that this is a limited means of funding for SMEs in Cameroon as they do not have access to the financial market on the one hand; and they are mostly family businesses that do not want to open their capital on the other hand. (Ndjeck, 2016, p.97). This refusal to open the capital blocks the development of venture capital companies in Cameroon.

Because SMEs in Cameroon have great difficulties in acquiring technical capital (Beyina, 2008, p.10) they find it hard to divest it. The cases of sales observed may be due to the need to replace the equipment which they got rid of.

SMEs in Cameroon also fund their long-term needs with the circulating resources.

Circulating formal financing of SMEs long-term and medium-term needs in Cameroon

The resources that SMEs usehere to meet their needs in the medium and long term are short-term and remain available to the company for a period not exceeding one year. They come from organized, regulated and controlled entities.

A survey conducted on 452 SMEs in Cameroon by Ndjeck (2016) on funding long-term and medium-term needs showed that:

- 23 out of 249 SMEs (9.23%) resort to current partner contributions;

- 30 out of 249 SMEs (12.04%) are financed by business-to-business credit;

- 45 out of 249 SMEs (18.07%) turn to microfinance institutions.

Circulating formal fundingfor long-term and medium-term needs of SMEs is dominated by microfinance institutions followed by business-to-business credit.

The recent economic crisis in Cameroon which has reshaped the banking environment, has also greatly drained cash towards microfinance institutions. This cash has been increasing in existing microfinance institutions and has fostered their proliferation (Poney 2013, MbouobouoNdam, 2007). Microfinance institutions with high cash are no longer limited to their primary mission, to finance the poor. They have become true financial businesses in Cameroon. However, it is regrettable that their resources remain limited because theydo not have any money creationpower. Similarly, their resources are short-term. They charge interest rates higher than banks. But they are preferable to banks when it comes to transactions to be settled in the short term (a few weeks, a few months).

The microfinance institutions that meet the financial needs of SMEs are now adopting the same characteristics as banks and are increasingly rationing credit (Mayoukou, 2008).

The business-to-business credit involved in the funding of SMEs'long-termneeds is the one granted by companies selling capital goods (Caspar & Enselme, 2001, p.110). However, the equipment that is needed is not always sold locally.

The informal sector is also involved in the funding of SMEs' long-term needs in Cameroon.

Informal funding of long-term and medium-term needs of SMEs in Cameroon

Informal funding is outside the regulated sector and beyond the control of the government.

We will distinguish collective practices from individual practices.

Collective practices

They include ROSCA and associations.

The survey conducted by Ndjeck (2016) on 452 SMEs in Cameroon on the funding of the long-term and medium-term needs of SMEs when they are rationed by bank credit revealed that:

- 63 out of 249 SMEs (ie 25.30%) rationed by bank investment credit are funded by ROSCA;

- 10 out of 249 SMEs (ie 4.01%) are moving towards associations.

ROSCAs are at the forefront of collective practices, informal funding and all types of SME long-term needs funding in Cameroon.

ROSCAs are rich in Cameroon and contribute to the creation and growth of enterprises in Cameroon (Mayoukou, 2000, Bekolo-Ebe, 1993). They are particularly marked in the regions of West, North-West and North Cameroon. And with the auction ROSCAs, one can get hundreds of millions per session to fundtheir needs (Ngongang & Wandji, 2002). However, one can worry that ROSCAsdo not have money creationpower, which somewhatlimits their resources. Even if the rotation period in some ROSCAsis two years, the factis that ROSCAshave short-term resources.

Associations, by facilitating funding for its members, have even more limited resources than ROSCAs.

Collective practices aremingled with individual practices.

Individual practices

This category includes: commercial ROSCAswhere the ROSCA member is both cash custodian and lender (Mayoukou, 2000), the contract used in the acquisition of transport equipment

(Mayoukou & Ossié, 1993), the "purchase/sale of movable property" practised by civil servants who purchase equipment goods on credit from the Cameroonian Equipment Company (SCE) and sell them back immediately to the "financiers" who work with the Cameroonian Equipment Company; and finally help from friends and relatives.

The survey on 452 SMEs by Ndjeck (2016) on SMEs'LTMTN funding when rationed by bank credit provided the following results:

- 32 out of 249 SMEs (12.85%) benefit from the help from friends;

- 35 out of 249 SMEs (14.05%) are supported by help from relatives.

The spirit that characterizes African solidarity in general and Cameroonians in particular is also obvious in business. Here, solidarity is spurred by the concern of getting the loved ones out of dependence. These aids play an important role in the funding of SMEs long-term needs. Most often, they are granted free of charge and are added to own funds, thus increasing the financial autonomy of the company and consequently its debt capacity and solvency.

Overall, it can easily be seen that SMEs which suffer from the rationing of bank credit for their long-term and medium-term needs mainly rely on short-term resources. Knowing the resources available to SMEs in Cameroon to meet their needs in the medium and long term, it is important to highlight these needs.

The long-term and medium-term needs of SMEs in Cameroon

The production of goods and services gives rise to needs. These can appear at the creation or during the lifetime of a company.

The needs of the company can be read through its balance sheet and its income statement. Balance sheet assets indicate the funding needs that are satisfied by the resources available to the company. These resources constitute balance sheet liabilities. The decrease in liability items reflects the need for funding. Balance sheet assets can be subdivided into two headings. On the one hand, fixed assets also referred to as assets of over one year or stable assets or

stable jobs or long-lasting jobs or long-termassets; and on the other hand, circulating assets also called assetsforless than a year or jobs within one year or cyclical jobs or circulating jobs or short-term assets. Balance sheet liabilities can also be subdivided into two main categories: on the one hand, permanent funding or stable funding or sustainable funding or funding for over one year, or stable resources / permanent resources / sustainable resources / resources for over one year or permanent capital or long-term liabilities; and on the other hand, circulating liabilities or circulating resources or resources for less than a year or short-term debts or short-term liabilities.

Fundingneeds for decreasing permanent financingconstitute long-term and medium-term needs.

Increase in fixed asset items

Fixed assets represent the economic capital of the company. It is an important part of its assets and indirectly contributes, through amortization and provisions, to the formation of cash flow (Peyrard, 1990, p.73).

Fixed assets can be analysed as intangible assets and tangible fixed assets.

Intangible assets

Intangible assets include: research and development expenses, fixed assets (patents, licenses, concessions and similar rights, software, trademarks, commercial funds, leasehold rights, creative investment, etc.).

In our work, we associate financial fixed assets with intangible assets. Financial fixed assets include: advances and down payments on fixed assets, equity investments, loans and other claims as well as fixed assets.

A study carried out by Ndjeck (2011) on 70 SMEs and relating to the long-term and medium-term needs of SMEs, all branches included, in Cameroon revealed that:

- 13 out of 70 SMEs (18.6%) acquire patents, licenses, concessions and similar rights;
- 16 out of 70 SMEs (22.9%) acquire software;
- 4 out of 70 SMEs (or 5.7%) buy business assets;

- 15 out of 70 SMEs (21.4%) acquire the right to leasehold;
- 19 out of 70 SMEs (27.1%) make advances and down payments on capital orders;
- 40 out of 70 SMEs (57.1%) make deposits and bonds;
- 12 out of 70 SMEs (17.1%) grant loans for more than one year. These are loans granted to staff.

The most represented intangible asset is deposits and guarantees. This higher figure can be justified by the fact that deposits and guarantees are required in the realization of most futures operations (the case of the purchase of goods and services such as telephone, internet, water and electricity consumption, loan of packaging and consignment ...) and financing operations. This figure is followed by advances and down payments. Advances and down payments are common in the acquisition of goods and the purchase of services in our area (the case of acquisitions and purchases on credit, the case of constructions ...).

Almost all SMEs in our sample ignore research (1 in 70 SMEs, or 1.42%). This is obvious because research is expensive and our SMEs have a weak and fragile financial capacity. Similarly, they have difficulties in employing highly qualified personnel to do research owing to lack of resources.

Knowing the intangible assets of SMEs in Cameroon, what are their tangible assets?

Tangible fixed assets

Tangible fixed assets consist of land, buildings, equipment and furniture. Ndjeck's (2011) survey of 70 SMEs on the long-term and medium-term needs of SMEs revealed that:

- 12 out of 70 SMEs (17.1%) acquire bare land;
- 22 out of 70 SMEs (31.4%) have buildings, technical installations and fixtures;
- 58 out of 70 SMEs (82.9%) acquire equipment;
- 56 out of 70 SMEs (80%) buy furniture
- 2 out of 70 SMEs (2.8%) have livestock (draft animals, breeding animals and guard animals).

Equipment and furniture come respectively in the first position of the tangible fixed assets at the disposal of SMEs in Cameroon. Every business needs equipment and furniture to function. They

are followed by constructions. Almost all businesses need shelter to establish themselves.

The decrease in permanent capital is the second component of long-term and medium-term needs.

The decrease in permanent funding

The decrease in permanent funding mainly concerns the reduction of capital, distribution of reserves, distribution of dividends, reinstatement of the investment subsidy, repayment of financial debts, realization of provisions for risks and charges.

Apart from repayment of financial debts, 27 out of 70 SMEs (38.6%), very few SMEs in Cameroon experience the need for permanent funding decrease.

Long-term and medium-term needs of this nature, other than repayment of financial debt include:

- 4 out of 70 SMEs (ie 5.7%) carry out capital reduction;
- 8 out of 70 SMEs (11.4%) distribute reserves to partners.

7 out of 70 SMEs (10%) and eight out of 70 SMEs (11.4%) respectively converted capital reserves and capital gains. Such an operation decreases reserves and profits respectively and increases capital. The conversion of a permanent resource into another permanent resource is therefore irrelevant to permanent funding and therefore does not constitute a funding need.

Having identified the long-term and medium-term needs of SMEs and identified the resources that enable to meet them, all that remains is to put more emphasis on the contextualisation of the rule of the minimum financial equilibrium and to encourage the SMEs in the use of the resources available to them in funding long-term and medium-term needs.

Contextualizing the rule of minimum financial equilibrium and orienting SMEs in the coverage of their needs in the medium and long term

Contextualizing the rule of minimum financial equilibrium implies the existence somewhere of an insufficiency of this rule before highlighting its contextualization.

The contextualization of the rule of minimum financial equilibrium

As we said earlier, we will first expose this rule before adapting it to an environment where stable resources are scarce.

The rule of minimum financial equilibrium

The rule of minimum financial equilibrium stems from the theories of financial structure. It can take three forms (Quintart, 1997). The first concerns the allocation between own funds and borrowed funds.

It occupies a central position on the theoretical and practical levels. So far it has been much in the news and has remained an enigma, in the sense that nothing can lead to an optimal financial structure for a given company, i.e. a combination of own funds and borrowed funds in order to maximize the value of the business. In other words, nothing can enableto reach an optimal debt limit by combining own fundswith borrowed funds.

However, the financial leverage effect is a limit to indebtedness in that by turning it, it changes into a "mass effect" on earnings per share, and thus on the profitability of shares. In fact, as a result of loans that cost more than they generate or, more generally, because operating results are lower than financial expenses, there is no use borrowing. In addition, a company will be more or less subject to risk depending on the share of the debt compared to own funds in the financial structure. In fact, own funds must be greater than debt (Van Horne, 1997) (principle of financial independence).

The second concerns the ownership structure of the company, i.e. the composition of the shareholding structure and, in turn, the structure of the share capital.

Share capital determines the management and control structure of the company. Two conditions seem to lead to a favourable structure. On the one hand, there is a shareholding (other than the necessary capital), intangible elements that contribute to the development of the company such as synergy between groups, business networks, the information system and influence, cultural diversity. On the other hand, a shareholding that monitors and accompanies the development of the company so that the entry of

new dominant ill-intentioned shareholders does not hinder or prevent the growth of the company.

The third aspect is about the duration of funds, i.e. the distribution between stable resources and circulating resources. This third aspect characterizes the necessary reconciliation between the duration of resources and the life of the assets acquired through these resources. In other words, the resources intended to acquire an asset must remain at the disposal of the enterprise for a duration at least equivalent to that of the asset. This is the rule of minimum financial balance. Cohen (1997) refers to it as the golden rule of financial equilibrium. It is the expression of financial security called working capital. In the absence of a financial safety margin, the company has every interest in avoiding two pitfalls. These are often complementary (Vernimmen, 1997, p.215):

- The "rush ahead": it lies on the acceptance of all the profitable projects of the company that can no longer self-finance its growth and it abusively resorts to debt in the short term instead of giving itself a structural financing, or even recapitalize;

- "Underinvestment": it results either from a rationing of voluntary capital, linked for example to the refusal to open capital to outside interests or to the need to respect a given level of indebtedness, or to a capital rationing imposed by the market as a result of a "rush ahead" that gives an unacceptable risk perception to creditors.

The fundamental financial adjustment that the company must ensure concerns the adequacy between duration or "maturity" or "term" of resources and those of jobs. The financial analysis must therefore assess whether the resources implemented are sufficiently stable, given the duration of the jobs to which they are assigned (Cohen, 1997). In other words, stable jobs must be financed by stable resources.

Harmonization between the duration of resources and that of jobs

Harmonization between the term of resources and that of jobs in sub-Saharan Africa in general and in Cameroon in particular is a lure, as far as SMEs are concerned. The scarcity of permanent resources for SMEs in Cameroon is due to several reasons:

inaccessibility of SMEs to the financial market, the nature of the resources available to commercial banks characterizing Cameroon's banking world, the rationing of bank credit due to the environment of SMEs (weak supply of credit money, low profitability of banking activity, weak transformation of bank deposits, high credit selectivity, low credit supply capacity, strong interest rate mismatch, crisis of confidence, asymmetry of credit information, risk, financial capacity of SMEs and managerial deficiencies (Ndjeck, 2016, p.30).

Since SMEs do not have access to long-term resources, they rely on alternative funding, which is essentially short-term (see appendices). These include ROSCAs, microfinance institutions, business-to-business loans, family and friends' aids (Ndjeck, 2011, 2016). The harmonization of resources and duration of jobs is then broken. Stable jobs are covered by circulating resources (short-term debts). However, this cover is not natural. Short-term resources are constantly being renewed to ensure the adequacy betweenstable jobs and short-term resources. Thanks to this transformation of short-term resources into long-lasting resources, we reach the rule of minimum financial equilibrium. By this practice, no doubt, the cost of capital is relatively higher than it would have been by obtaining long-term funding. However, between funding a profitable project at a relatively higher cost and abandoning an opportunityfor lack of sustainable resources, the choice is obvious. We invest in the project despite an additional cost compared to the use of stable funds.

The result we reached here had already been highlighted by Barreau & Delahaye (2003, p.275). According to them, companies are developing by funding part of their stable jobs through constantly renewed short-term credits.

The orientation of SMEs in the move to meet their medium-term and long-term needs

This orientation will focus on two essential points:

- Alternative funding;
- Some remedial solutions to the rationing of bank credit.

Alternative funding

Alternative funding is the only bulwark of SMEs, they must know how to rush to it.

With regard to short-term funding resources, we had already said that we had to constantly renew them to ensure stable jobs for stable resources balance. On the other hand, we can proceed to a joint use of these resources and their order of preference. The order of preference will be based on the factors of choice such as the cost of funding, procedures toobtain it, the duration of the resource, the adaptation of the terms of repayment to the financial constraints of the company, the guarantees requested, the accessibility to the source of funding and the importance of funding.

As regards alternative long-term funding (leasing institutions, venture capital companies, internal funding), despite some requirements currently imposed on financial leasing institutions (initial input to the project, risk analysis), this route must to be prospected by SMEs. It offers them many more advantages in that the procedures are simpler, the property taken out in leasing constitutes the only guarantee; this contract makes it possible to fight against obsolescence and to follow the technical progress. The control mechanisms of the company are here smaller, which would reduce the cost of funding. This funding method does not deteriorate the financial independence of the company.

After the leasing institutions, venture capital firms as a source of funding are recommendedfor fundinglong-term needs because they provide capital and long-term loans and participate in the management of the company for a given period. Not only can SMEs benefit from their funding, but they still have the advantage of benefiting from their expertise and experience. But, since our businesses are essentially family-run, they are allergic to the opening of the capital and, by implication, seem less to solicit this source. Yet, it can help them resolve the problem of financial equilibrium. Let SMEs in Cameroon experience more this source of funding.

The low profitability of SMEs coupled with mismanagement does not help internal funding. The weak financial capacity of SMEs (Edding, 2002) does not help capital increase.

SMEs cannotmake do with the short-term resources that constitute the most important part of their fundingfor long-term and medium-termneeds. They must rise up to the standards of bank funding. As such, they have every interest in fighting the rationing of bank credit.

Some remedial solutions to the rationing of bank credit

Some remedial solutions to the rationing of bank credit include reducing the asymmetry of information and risk as well as SMEs fears and cleaning up the macro environment.

Customer relationship, communication, co-operative arrangements, equity participation, signal and incentive models, and data-based organizations are ways to reduce information asymmetry.

Group lending, the quality of SME management, high selectivity, covenants and controls lead to risk reduction.

In addition to thesolutions outlined above relating to the reduction of asymmetry of information and risk, public authorities and banks are called for action.

Public authorities must clean up the macroeconomic environment, by restructuring the banking system (creation of development banks, introduction of credit lines just for SMEs in the presence of the bank of SMEs which somewhat hesitates on the financing of this category of enterprise, facilitating rediscounting to the profit of SMEs), by setting up an SME support organization such as FOGAPE (Credit Guarantee Fund for Small and Medium-sized Enterprises), by further reforming the judiciary system and by fighting more against corruption.

As for the banks, they must carry out a specific financial analysis of SMEs. They must go beyond traditional financial analysis based on accounting documents and integrate the customer relationship characterized by direct contact with the entrepreneur and company visits.

Conclusion

The purpose of our work is to highlight the difficulty of the strict or absolute application of the rule of the minimum financial equilibrium according to which a resource intended to fund a job

must remain at the disposal of the company for a certain period which should be at least equal to the duration of the job funded. To be brief and simple, stable jobs must be funded by stable resources.

The experience of SMEs in Cameroon has shown that, since they are overly affected by the rationing of bank credit, they mainly use short-term alternative funding to meet their long-term and medium-term needs. This alternative funding is dominated by ROSCAs, microfinance institutions, business loans, relative and friend helps.

It is therefore very easy to understand that in Cameroon the rule of minimum financial equilibrium is not applicable for this type of enterprisebecause stable jobs are funded here by short-term resources.

As for how these SMEs manage to harmonize long-term and short-term resources, the answer is that the SMEs are constantly renewing their short-term resources to ensure their financial equilibrium.

However, such an equilibrium is fragile and can lead the company to a situation of chronic need ofworking capital, illiquidity, and thus compromising its solvency in the short term and in the medium term.

SMEs therefore have every interest in developing strategies that can make them eligible for long-term funding. Only long-term funding can stabilize their financial structure. For this reason, we have to question the SMEs themselves, the banks and the public authorities. An interaction between the three might be necessary. This would make it possible to understand the problems SMEs confront and respond to them with appropriate solutions. However, one may wonder if there has ever been such a forum. If a dialogue betweenSMEs and the government has given rise to SMEs' bank, we can wonder why SMEs are still unable to find an answer to their funding needs. Moreover, can still wonder whether the SMEs' bank would experience the same obstacles as the commercial banks that preceded it? Or, the absence of an SME support organization such as FOGAPE would create a vacuum in the support for SMEs? What is wrong with the SME Bank in Cameroon, with regard to the funding of SMEs? These questions may be answered in our future work.

Appendixes

Table 1. *Alternative Funding Methods Solicited by SMEs*

Method of funding	Number of SMEs that have chosen the method of funding				Total	Rank
	Operating Rationing	Mid-term rationing	Long-term rationing	Quantitative rationing		
Business-to-business credit*	65	28	2	10	105	5th
ROSCAs*	112	49	14	28	203	1st
Associations*	56	10	-	16	82	6th
Family support*	62	27	8	22	119	3rd
Help from friends*	60	28	4	21	113	4th
Microfinance Ets*	62	39	6	25	132	2nd
Current competitions of associates*	31	21	2	-	54	7th
Increase in capital**	5	8	12	-	25	8th
Ets of leasing**	-	21	4	-	25	8th
Venture Capital Companies**	-	4	-	-	4	11th
Disposals of fixed assets**	-	8	4	-	12	10th
Individuals (usurers)*	-	1	-	-	1	12th

Source: The author's survey

Note: * Short-term funding methods; ** Long-term and medium-term funding methods

Table 2. *The relationship between the types of rationing of bank credit and the types of alternative funding of SMEs (logit model).*

The GENMOD Procedure (logit)

Analysis Of Parameter Estimates

Parameter	DF	Standard Estimate	Wald 95% Confidence Error	Limits		Chi-Square	Pr>ChiSq	Odds Ratio
Intercept	1	5.4161	1.4173	2.6381	8.1940	14.60	0.0001***	
TR RL	1	-3.0802	1.4231	-5.8695	-0.2909	4.68	0.0304**	0.04595
TR RQ	0	0.0000	0.0000	0.0000	0.0000			1
Scale	0	1.0000	0.0000	1.0000	1.0000			

LR Statistics For Type 3 Analysis

Source	DF	Chi-Square	Pr >ChiSq
TR	1	15.45	<.0001

Note: The scale parameter was hedl fixed; ** Significant at 5%; *** Significant at 1%

Source: The author's survey

Table 3. *Relationships between intangible, tangible and financial assets and SMEsfunding methods*

		Ownfund	ROSCAs			Fam aids, friends and donations	Debts over 1 year	Debts at -1 year except ROSCAs
			1 year (L)	1 year				
				(L)	(C)			
Intangible, tangible and financial assets	Correlation of Pearson	0.429*	0.268*	0.433*	0.018	0.445	0.225*	0.032
	Sig. (Bilateral)	0.0000	0.025	0.004	0.06	0.0000	0.031	0.793
	N	70	70	70	70	70	70	68

Notes: ** The correlation is significant at the 0.01 level (bilateral). L = Levels of ROSCAs; * The correlation is significant at the 0.05 level (bilateral). C = ROSCA credits.

Source: The author's survey

Table 4. *Relationship between a decreases in permanent capital and SMEsfunding patterns*

		Ownfund	ROSCAs			Fam aids, friends and donations	Debts over 1 year	Debts at -1 year except ROSCAs
			+1 year (L)	1 year				
				(L)	(C)			
Decrease in permanent capital	Correlation of Pearson	0.451*0	0.057*	0.052*	0.011	0.059	0.0367**	0.173
	Sig. (Bilateral)	0.0004	0.002	0.003	0.90	0.630	0.002	0.158
	N	70	70	70	70	70	70	68

Notes: ** The correlation is significant at the 0.01 level (bilateral). L = Levels of ROSCAs; * The correlation is significant at the 0.05 level (bilateral). C = ROSCA credits.

Source: The author's survey

Table 5. *The long-term and medium-term needs of SMEs funded by ROSCAs*

	frequency		
	+1 year (L)	1 year	
		(L)	(C)
Validyes	20	24	8
No	50	46	62
Total	70	70	70
Valid Percentage	28.57	34.28	11.41

Source: The author's survey

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4 Impact of rural land distribution on the South African economy

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Introduction

Mostempirical studies on rural land distribution applied the SAM multiplier decomposition and structural path analysis to analyse the intersectional linkages and the strong linkages observed in the research can be the result of wage income from employment in commercial farms. The multiplier decomposition analyse assumes linearity and fixed prices; since these static models fail to deal with structural changes in income distribution and production technology as a result of rural land distribution, the analysis may understate the overall impacts of rural land distribution. This study relaxes these assumptions of SAM analysis by applying a dynamic CGE model to investigate the

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impact of rural land distribution on the economy, poverty and income distribution in South Africa. Most of the empirical work on the impact of rural land distribution concluded that access to productive agricultural land increases household welfare as rural land distribution improves income, and can increase agricultural output. Household income and agricultural productivity can increase or decrease depending on the size of agricultural investment and government support to the beneficiaries of the rural land distribution. Literature also indicated that small holders are less productive compared to commercial farmers, and hence the impact of rural land distribution will be negative on the total agricultural output. However, in relation to rural land distribution in the long-run rural land distribution, eventually small-holder farmers will become more productive due to technical progress, and hence the output impact will be less negative. The rural land distribution policy increases the income of smallholder farmers and decreases the income of the wealthy beneficiaries, thereby facilitating more equitable distribution of income in the long-run. Therefore, this research uses a dynamic CGE simulation to examine the impacts of rural land distribution on economic growth, household poverty and income distribution in South Africa.

This study relaxes these assumptions of SAM analysis by applying a dynamic CGE model to investigate the impact of rural land distribution on the economy, poverty and income distribution in South Africa. Most of the empirical work on the impact of rural land distribution concluded that access to productive agricultural land increase household welfare as rural land distribution improves income and can increase agricultural output. Household income and agricultural productivity can increase or decrease depending on the size of agricultural investment and government support to the beneficiaries of the rural land distribution. Literature also indicated that small holders are less productive compared to commercial farmers hence the impact of rural land distribution will be negative on total agricultural output. However, in the long run rural land distribution, eventually small holders farmers will become more productive due to technical progress hence the output impact will be less negative. Due to rural land

distribution, the distribution of income in the long run will eventually be more equal as commercial farmers will be less rich and small holder farmers' income will be better. This research therefore uses a dynamic CGE simulation to examine the impacts on rural land distribution on economic growth, household poverty and income distribution in South Africa.

Theoretical review

The computable general equilibrium simulation model

The study adopted a recursive dynamic Partnership for Economic Policy (PEP 1-t) standard model proposed by Decaluwe *et al.,* (2010). The model is calibrated to a 2009 SAM for South Africa. The SAM serves to identify the different economic agents and provides database for model calibration. The model has 49 activities and 85 commodities. The model uses two broad factors of production, that is, capital and labour; however, the labour is disaggregated by the education level and per capita expenditure deciles.

Computable general equilibrium model

The CGE model is one of the most valuable methods to analyse economic changes due to policy changes (Dervis *et al.,* 1982; Sadoulet & De Janvry, 1995; Wobst, 2001, 2002), and these CGE models have become a standard tool for empirical policy analysis (Lofgren, Harris & Robinson, 2002). The basic theoretical framework of the CGE models is a competitive market equilibrium that satisfies the Walras law (Decaluwe & Martens, 1988) and these CGE models are widely applied and recognized as the best tools for conducting analyses for macroeconomic policy shocks. Thus, researchers in both developed and developing countries mostly use these CGE models to conduct simulations of policy impacts because these models can effectively capture productivity change due to a government policy.

However, most empirical CGE models are static in nature; additionally, most empirical work that applied CGE modelling failed to capture the transmission mechanisms between changes in policy and consider the long-term (Cockburn *et al., 2013*).Though

static CGE models are crucial for policy analysis, these models cannot provide a detailed poverty analysis because they depend on aggregated data. Thus, recursive CGE models combined with microsimulation models are more appropriate for examining the growth and distributive impacts of the government policies. These recursive CGE models are appropriate and are important for policy impact analysis as they allow for simulation of the evolution of capital over time and provide a dynamic dimension to the transmission mechanisms. Once these mechanisms are appropriately modelled, poverty and inequality implications of policies can be effectively assessed using microsimulation techniques. Therefore, this study adopted this approach to analyse the distributive impacts of land redistributive policies in South Africa.

Micro simulation model

The microsimulation models are based on the work of Orcutt (1957, 1961), and these models were developed to capture the distributional aspects of policy changes that were largely ignored under most empirical economic models. These microsimulation models try to capture the distributions of earnings and incomes of households by explicitly incorporating the individual level data on households and individuals. Combined with economy-wide models, the micro simulation models are used to simulate the impact of changes in policy on macro-aggregate variables, consumption pattern, and micro level income.

The macro-micro model

The dynamic CGE modeling provides an economy-wide assessment of policy, while a microsimulation model enables a detailed poverty analysis. Thus, this study uses a top-down approach for effectively analysing the impact of the rural land distribution on poverty. The combination of the CGE and microsimulation aims to provide a tool for analysing the macro economic impact of the rural land distribution; these models are integrated with micro-data that aim to provide a detailed distributional analysis.

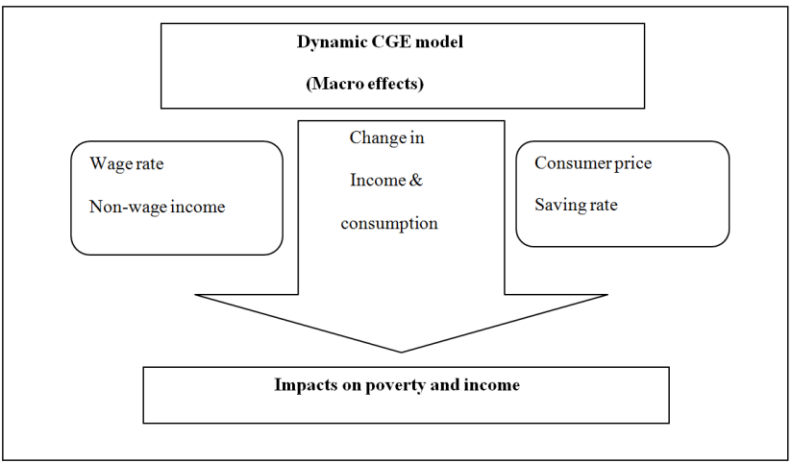

Figure 1. *The macro-micro simulation model*
Adopted from Zhang, Wang, & Chen, (2011).

The CGE microsimulation model operates in two stages; the first stage involves running the CGE model to generate changes in prices, production and income due to policy changes. These changes are incorporated into the household model through the use of linking variables; subsequently, a disaggregated microsimulation model is used to simulate changes to income of individual households. The results of the simulations from the macro CGE model are then combined with the simulation derived from the micro model to provide both the accumulative and distributional impacts of the rural land distribution policy.

The dynamic CGE model will capture the macro effects of rural land distribution which include changes in wages, non-wage revenues, commodity prices, and GDP and savings rate. The simulation models will traces the effects of the macroeconomic changes on household welfare.

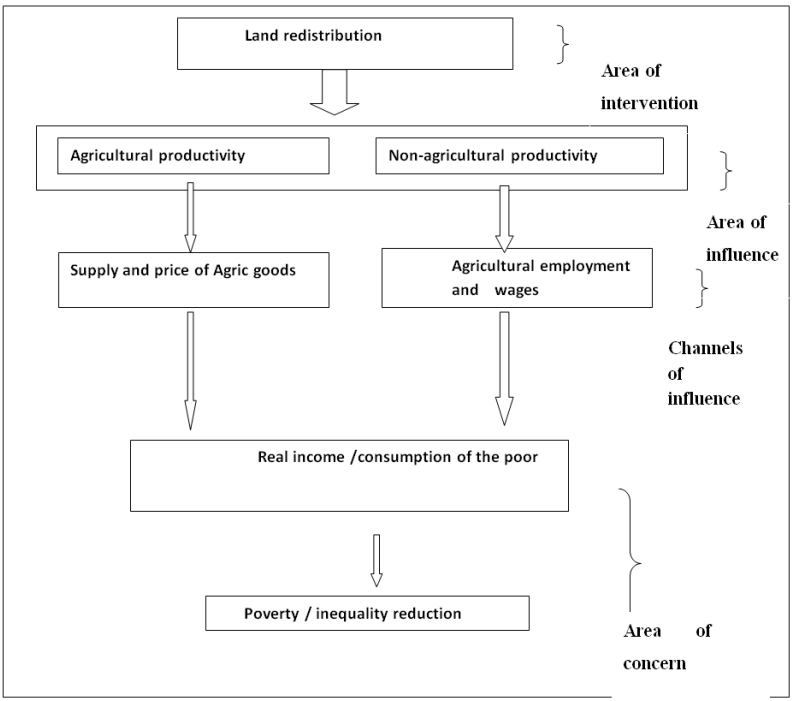

Figure 2. *Analytical Framework*
Adopted from Ali & Pernia (*2003*).

Rural land distribution has the potential to reduce poverty through an increase in agricultural productivity and food security in rural areas of many developing countries. In rural areas agricultural productivity can bring about improvement in employment and wage prospects for the poor people (Ali & Pernia, 2003). An increase in employment will translate into an increase in real income for the poor, and increased agricultural productivity will have an effect on the supply and prices of basic goods.

The production model adopted in this study is a multi-stage nested structure of production function where production and demand side interact simultaneously. Sectorial output is modeled using a Leontief production function and value addition is modelled by a constant elasticity of substitution in the non-agricultural sector and constant elasticity of substitution function of land and a composite factor of production. The constant

elasticity of substitution will be used for primary factors, which are agriculture, capital, and labour. The short-run use of capital is fixed and sector-specific, but the labour categories are assumed to be freely mobile across sectors.

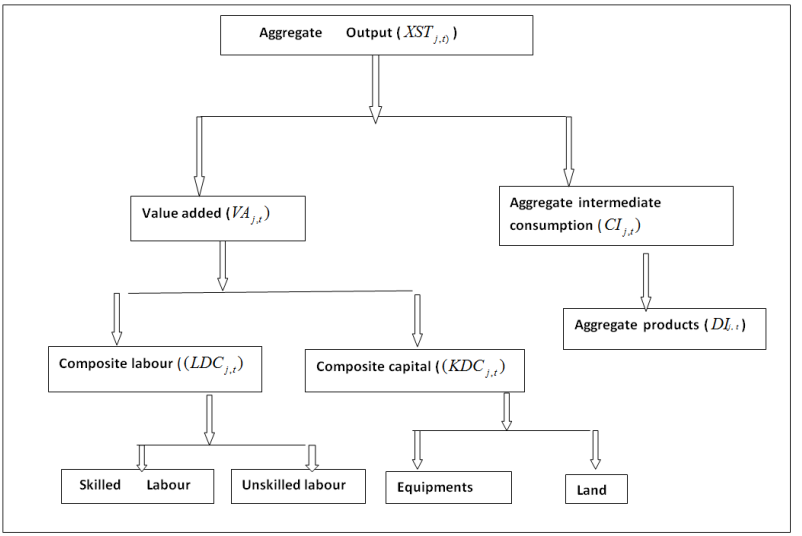

Figure 3. *Structure of the Production*

The sectorial agricultural output of each productive activity j is a combination of the value added and the total intermediate consumption. The output produced by different sectors is sold to other production sectors as intermediate inputs and the some of the output is consumed domestically or exported to other countries. To model the substitutability between domestically-consumed goods and exported goods and the model the imperfect substitution between domestically-produced goods and imports, the models use the constant elasticity of substitution function. This modeling technique allows the investigation of the impact of external forces on domestic prices.

From the sectoral output $XST_{j,t}$, the value added by industry j is given by:

$$VA_{j,t} = v_j XST_{j,t} \quad (1)$$

Additionally, the total intermediate consumption by industry j will be given by:

$$CI_{j,t} = io_j XST_{j,t} \tag{2}$$

where:

$CI_{j,t}$: is the total intermediate consumption of industry j

$XST_{j,t}$; Total aggregate output of the industry j

io_j : and v_j : are coefficients (Leontief-intermediate consumption and Leontief –value added)

The industry's value added is made up of composite labour and capital which follows a constant elasticity of substitution specification given as:

$$VA_{j,t} = B_j^{VA}\left[\beta_j^{VA} LDC_{j,t}^{-\rho_j^{VA}} + (1-\beta_j^{VA}) KDC_{j,t}^{-\rho_j^{VA}}\right]^{\frac{1}{\rho_j^{VA}}} \tag{3}$$

where;

$KDC_{j,t}$: is the demand for industry j composite capital

$LDC_{j,t}$:is the demand for the industry j demand for composite labour

B_j^{VA} :is the scale parameter (CES-value added)

β_j^{VA} :is the share parameter

ρ_j^{VA} :is the elasticity parameter

Household income is derived from three main sources which are labour income, capital income and transfers from other agents. Each household receives a fixed share of earnings from each type of labour. Total capital income is distributed between agents and transfer income is the summation of all transfers received by a household. Thus, the total income for type h households will be represented by:

$$YH_{h,t} = \sum_l \lambda_{h,l}^{WL}\left(W_{l,t}\sum_j LD_{l,j,t}\right) + \sum_k \lambda_{h,k}^{RK}\left(\sum_j R_{k,j,t} KD_{k,j,t}\right) + \tag{4}$$

where;

$R_{k,j,t}$:is the rental rate of k capital in industry j

$W_{l,j}$: is the wage rate of type l labour

$\lambda_{ag,k}^{RK}$: is the share of type k capital income received by agent ag; and

$\lambda_{h,l}^{WL}$: is the share of type l labour income received by type h households

The disposable consumption of households is calculated after deducting transfers, taxes, and savings, and the objective of these households concerning consumption expenditure is to maximize the utility, subject to the prevailing market prices.

The representative firm's income comprises the share of capital income and transfers received from other agents resulting in:

$$YF_{f,t} = YFK_{f,t} + YFTR_{f,t} \tag{5}$$

where:

YFf,t : is the total income of type f business

$YFK_{f,t}$:is the capital income of type f business, and

$YFTR_{f,t}$;is the transfer income of type f business

The firm pays tax to the government such that the residual that remains after subtracting transfers from disposable income. Form the business savings. The saving equation will be given by:

$$SF_{f,t} = YDF_{f,t} - \sum_{ag} TR_{ag,f,t} \tag{6}$$

where:

SFf,t :is the savings of type f business

$TR_{ag,agij,t}$; is the transfer from agents

$YDF_{f,t}$: is the disposable income of type f business

The government draws its revenue from income taxes give by both households and businesses, taxes on products and imports, and other taxes on production. The government sector also receives part of the remunerations of capital and transfers from

others agents. Thus, the government revenue function will be given by:

$$YG_t = YGK_t + TDHT_t + TDFT_t + TPRODN_t + TPRCTS_t + YGTR_t \quad (7)$$

where, YG_t : is the total government revenue, YGK_t : is government capital income, $YGTR_t$: is government's transfer income, $TDFT_t$: is government's revenue from business taxes, $TDHT_t$: is government's revenue from household taxes and $TPRODN_t$; is government's revenue from taxes on production.

Producers allocate output to maximize sales revenue at given product prices, subject to total aggregate production. Total aggregate output describes the ease with which the production mix can be adjusted in response to price changes. The output equation is represented as:

$$XSTj,t = B_j^{XT}\left[\sum_i \beta_{j,i}^{\rho_j^{XT}}\right]^{\frac{1}{\rho_j^{xt}}} \quad (8)$$

where, $XS_{j,i,t}$; is production of commodity i by industry j, B_j^{XT} :are scale parameters, $\beta_{j,t}^{XT}$; is a share parameter, and ρ_j^{XT}; is the elasticity parameter. The total industry output will be divided between the domestic and international market such that;

$$XS_{j,i,t} = B_{j,i}^{x}\left[\beta_{j,i,t}^{X} EX_{j,i,t}^{\rho_{j,x}^{X}} + (1-\beta_{j,i}^{X})DS_{j,i,t}^{\rho_{j,x}^{X}}\right]^{\frac{1}{\rho_{j,i}^{X}}} \quad (9)$$

where; $DS_{j,i,t}$: refers to supply to the domestic market and $EX_{j,i,t}$; refers to the quantity exported.

The factor market for land is considered a closed market by assuming that the quantity of agricultural land is fixed and that the total sectoral land use is equal to the total supply of productive land. The capital market is considered a closed market by assuming that the demand for capital is equal to its supply, thereby implying full employment of capital. However, owing to

the high unemployment rates in South Africa, the labour market is not closed.

The CGE model is solved over time and links one period to the next and thus the variables are assumed to grow over time. Over time total labour supply is assumed to increase at the same rate as exogenous population growth;

$$LS_{l\bullet,t+1} = (1+n_t).LS_{l,t} \tag{10}$$

Other variable that are assumed to grow at the rate of population growth are the current account balance, minimum consumption by households, government expenditures, public investment by category.

The household minimal consumption is also assumed to grow according to the population growth rate. This can be represented as:

$$C^{\min}_{i,,h,t+1} = (1+n_t).C^{\min}_{i,h,t+1} \tag{11}$$

The capital stock is updated by an accumulation function that gives:

$$KD_{k,j,t+1} = (1-\delta_{k,j})KD_{k.j,t} + IND_{k,j,t} \tag{12}$$

Where; $IND_{k,j,t}$: volume of new capital investment and $\delta_{k,j}$: depreciation rate of capital

The household income and expenditure vectors will be recalculated using household survey data. First we establish the link between domestic final consumer goods and consumption categories and then the link them to household incomes sources (returns from factors of production, dividends, net transfers from government and rest of the world) and sources of income identified in the survey data.

The aggregate values for household categories will be calculated by multiplying individual household values by sampling weights and sum over all households in each region. The household consumption will then be modelled as:

$$CH_{hh,i} = MINI_{hh,i} + \beta_{hh,i}(CTH_{hh} - \sum PC_j MINI_{hh,i}) / PC_i \quad (13)$$

Where $CH_{hh,i}$ -consumption of good i, $MINI_{hh,i}$ -minimum subsistence required for commodity i, $\beta_{hh,i}$ - marginal share of good i in its consumption, PC_j -composite price of good j.

The household income will be then the addition of earnings and other observed income such that:

$$Y_h = (\sum_{i \in h} PGE_{i,FS} \times FW_i + PGE_i, _{IS} \times IW_i + y_h - taxes_h) / CPI_h \quad (14)$$

The results summarizing the impacts of agricultural land reform from the dynamic CGE model are fed into a micro simulation household model to obtain the predicted household effects (Chitiga *et al.*, 2007). The per capita consumption in real terms for the base year and the simulation periods will then be the bases for estimating poverty and inequalities changes across the different scenarios. The per capita variable is affected by the change in goods prices and corresponding wage employment changes. The household income generation model is given by a set of equations capturing earnings and net income function of the households.

The earnings of household member will be given as function of the personal characteristics which include age, education, geographical region and unobserved earning determinants. The earning function is given:

$$LogW_{mi} = \alpha_{g(mi)}) + x_{mi}\beta_{g(mi)} + \nu_{mi} \quad (15)$$

The earnings function is separated according to labor market segments $g(mi)$. The net income function which includes the opportunity cost of household labor and profit depends also on household characteristics is given as:

$$LogY_m = \gamma_{f(m)} + Zm\delta_{f(m)} + \lambda_{f(m)}N_m + \eta_w \quad (16)$$

Where Z_m represent household's characteristics and N_m denotes activities.

Total household real income is defines as the sum of wage income of its members, profit from self- employment and non-labor income given as:

$$Y_m = \frac{1}{p_m}\left(\sum_{i=1}^{k_m} w_{mi} IW_{mi} + y_m IND(N_m \succ 0) + y_{0m}\right) \tag{17}$$

The occupational choice made by households is given by a combination of two equations given by:

$$P_m = \sum_{k=1}^{K} s_{mk}\rho_k \text{ and}$$
$$IW_{mi} = Ind\left[a^w_{b(mi)} + z_{mi}b^w_{h(mi)} + u^w_{mi} \text{ £ } \sup(0, a^w_{b(mi)} + z_{mi}b^s_{h(mi)} + u^s_{mi}\right] \tag{18}$$

These wage and prices changes will be obtained from CGE simulation results.

Poverty effects are measured using the Foster-Greer-Thorbecke (FGT) index which is defined as:

$$P_\alpha(z) = \frac{1}{N}\sum_{h=1}^{H}\rho_{h,d}((x - e_{h,d,t}(P_{k,x,o}, P_{k,d,t,}y_{h,d,t})/x, o)^\alpha_t, \tag{19}$$

where X is the poverty line, y is income and α is the degree of aversion to poverty. However this index will provide a single dimension of poverty, yet rural household are deprived in a multi dimension ways. To capture these multidimensional aspects of poverty, a Bourguignon and Chakravarty index is also adopted in this study. The index is defined as:

$$\Pi(x_i, z) = \left[\beta_1 g_i^{\varepsilon},_1 + (1-\beta_1) g_i^{\varepsilon},_2\right]^{\frac{\alpha}{\varepsilon}} \tag{20}$$

Where z : poverty line, β is poverty attribute weights and α is the aversion to poverty gap. Although different poverty lines are adopted by different analyst for south Africa (Hoogeveen & Ozler,

2002), Deaton (1997), this study used a poverty line of 3862 South African rands per year as suggested by Hoogeveen & Ozler, (2002); Chitiga & Mabugu, (2007a).

Income inequality on the other hand is calculated using the Gini coefficient which computes the average between cumulative population shares and cumulative income shares (Duclos & Araar 2006). The coefficient is calculated as;

$$Gini \equiv l(2) = \int_0^1 (p - l(p))k(p;2)dp \quad (21)$$

Where $l(p)$ is the cumulative percentage of total income held by the cumulative proportion p of the population and k represents the percentile-dependent weights.

Data analysis and simulation

The study used a recursive dynamic CGE microsimulation modeling technique to present a scenario in which the government progressively redistributes 30 % of productive land from large-scale commercial farmers to small-scale farmers in line with the NDP 2030. This modelling technique combines a microsimulation model and a standard multi-sectoral recursive CGE model to simulate the full distributional impact of a rural land distribution policy and generate counterfactual scenarios. The microsimulation adopted in this study helps to understand the key determinants and mechanisms of inequality and poverty, and the recursive dynamic microsimulation model can provide disaggregated results at the microeconomic level that are consistent with a macroeconomic framework.

The study assumes that there are two different types of farmers,' that is, large-commercial and small scale farmers and that these farmers have different production technologies. However in the 2009 SAM for South Africa, the agriculture sector is aggregated; hence, the agricultural account in the social accounting matrix was spilt according to the type of farming (small-scale or large-scale farming) using the proportion and ratios from Statistics South Africa.The splitting was essential for the calculation of

revenues shares for the different categories of farmers. In addition, the capital account in the agriculture sector needed to be disaggregated into land and equipments as these are the main forms of capital used in the agricultural sector.

The rural land distribution simulated in this particular study is based on the current market's based willing-buyer, willing-seller approach where the government provides grants for financing the programme. Land is redistributed to farmers that are assumed to be constrained in technology and production options, and hence it is assumed that production tends to be low in the agriculture sector and cropping patterns tend to become less tradable-oriented. The small-holder production patterns will shift domestic prices and increases agriculture's terms of trade. In the simulation, the study assumes that the total agricultural land (82 million hectares) is a fixed percentage of land that is redistributed, and its success is directly correlated with a decline in production.

This simulation tries to give some preliminary answers to the current debate on the impact of the proposed rural land distribution in South Africa.

The study will yield knowledge about the impact of rural land distribution on growth, poverty reduction and income inequalities in South Africa. These results will help in policy formulation aimed at reducing poverty and income inequalities among the rural households who are faced with long term poverty and widening income gap.

Results

The simulation assumed that total quantity of productive agricultural land remains constant and the land is either utilised by large commercial farmers or smallholder beneficiaries. In the experimental scenario total agriculture arable land is maintained at the same level as the base year and simulates a land transfer of 30% from commercial to small scale farmers over a 10 year period. For proper analysis of the underlying land allocation and macroeconomic issues, and wastage is assumed away (Chitiga, 2007). The counterfactual results were analysed in both the short run (first year period) and the long run relative to the base scenario. The macroeconomic impacts are reported in Table 1.

Table 1.*Macroeconomic effects (% change from base year value).*

Variables	Short- run	Long- run
Domestic agricultural demand	-0.1225	0.15
World agricultural export demand	-0.3217	-0.3179
Agriculture supply		
Commercial	0.21	0.58
Small scale	-21.01	-15.76
Agricultural exports		
Commercial	0.23	0.21
Small-scale	-12.17	-15.91
Intermediate agricultural consumption	0.377	0.55
Capital agricultural investment		
Commercial	1.72	1.83
Small scale	-21.01	-26.32
Price (CPI)	0.01	1.01089
User cost of capital	-0.01	0.03
Real gross domestic product	-0.0227	0.0278
Agricultural imports	0.329	0.3319

Source: Author's calculations, based on simulation results, Notes: Short-run (SR) refers to the year 2015 (start of simulation) and long-run (LR) refers to 2025 (end of simulation).

The results in Table1 show, that for most macroeconomic variables, the impacts tend to be negative in the short-run but gradually increase in the long-run. Agricultural imports, prices, agricultural consumption, and commercial agricultural supply record positive growth both in the short-run and long-run. However, the magnitude of growth is very marginal with most of these variables recording a 0.05% growth. The impacts on both real GDP and domestic agriculture demand declined in the short-run (-0.0227 and -0.1225 respectively) and the marginally increases in the long run compared to the business-as-usual (BaU) simulation. The short run negative impact for most of the macroeconomic variables can be explained by the contraction of the agriculture sector due to rural land distribution as most of the beneficiaries do not have the means and capacity to fully and productively utilize the land. The contraction of the agriculture sector is transmitted into other sectors of the economic through backward and forward linkages. Significant positive growth is observed in the price levels both in short run and long run. The significant decline in agriculture supply especially among small scale may bid up the domestic prices especially of agricultural

products. The user cost of capital also declines in both the short run and long run.

Table 2.*Price effects (% change from base year value).*

Variables	Short run	Long run
Basic price of agricultural production	0.200	0.202
Purchase price	0.1798	0.1822
Intermediate consumption price	0.031	0.02
Price of local products	0.191	0.192
Agricultural export price	0.139	0.122
FOB price of exported commodity	0.126	0.13
Price (CPI)	0.008	0.008

Source: Author's calculations, based on simulation results

The general prices were both positive in the short run and long run depicting an increase in prices as a result of redistribution of land. The price (CPI) and purchase price increases both in the short run and long run with significant increases noted in the FOB prices of exported price and purchase prices of agriculture prices. The marginal increase in FOB prices is essentially due to the increase in the cost of trade and transportation margins. These marginal changes in domestic and export price implies that the country is not gaining much ground with respect to its agricultural trade competitors. This showed that agricultural rural land distribution will affect the agricultural trade rating of South Africa with respect to its major trading competitors.

Table 3.*Effects on factors of production (% change from base year value)*

Variables	Short run	Long run
Demand for capital		
Equipments	0.00	0.156
land	5.00	1.93
Supply of capital		
Equipments	0.685	0.200
land	0.00	0.0002
Demand for labour		
Commercial agriculture	0.969	1.115
Small scale agriculture	-13.808	-17.056

Source: Author's calculations, based on simulation results

An increase in land for small holder agriculture tends to reduced the demand for labour especially in the small scale agriculture both in the short run and long run (-13.808 and -17.056 respectively). The demand for natural capital in form of land increased significantly in the short run as everyone will need his/her own piece of land but decreased sharply in the long run (5.00 to 1.93) as most of the small scale farmers tend to abandon the land. The supply of capital equipments dropped from 21.6% as there is limited investment in the agriculture sector by large commercial farmers. The reduction in output in many agricultural subsectors leads to reduced demand for both capital and labour.

Table 4.*Percentage Changes in Volumes from BaU Path*

	Domestic supply		Domestic consumption		Domestic demand for local goods		Total intermediate demand		Total intermediate consumption	
	SR	*LR*	*SR*	*LR*	*SR*	*LR*	*SR*	*LR*	*SR*	*LR*
agriculture	0.2055	0.579	-0.12	0.11	-0.12	0.15	0.09	0.1	0.377	0.55
food	0.372	0.362	-0.02	0.01	-0.026	0.5	-0.1	0.03	-0.022	0.035
trade	-0.01	0.002	-0.022	-0.203	-0.203	0.013				
manufacturing	-0.166	-0.18	0.02	0.018			0.01	0.03	0.037	0.082
dairy					0.02	0.3	0.03	0.2	-0.0323	0.029
transport	0.005	0.012	-0.03	-0.02						
education			-0.02	-0.01	0.006	0.019			-0.0223	0.033
service	-0.182	-0.179					0.21	0.31		
fish	-0.087	-0.09	-0.006	0.009						
meat	-12.5	-16.21	-0.03	0,02	0.166	0.25	0.02	0.01		
forestry			-0.01	-0.02					-0.0012	0.01

Source: Author's calculations, based on simulation results
Notes: Short run (SR) refers to the year 2015 (start of simulation) and long run (LR) refers to 2025 (end of simulation)

Table 4 shows the impacts on the different sectors of the economy mostly agriculture related sectors. The results in Table 2 showed that domestic agriculture production decreased significantly in most subsectors including food, meat, and even manufacturing sectors. The decrease in production of the most subsectors will affect many sectors of the economy through intersectorial linkages. Most sectors will have reduced aggregate output and export; hence most of these firms are unable to adjust their nominal wage of labour. This may led to reduced labour demand especially in agriculture subsectors. The decrease in

labour in labour demand aggregate supply expands mostly in the crop sectors will translate into decreased household income as their income is based on labour income. The decrease in household income both in the short run and long run will negatively affect household consumption.

The results showed that there will be decreased production activity among most sectors and this decrease will translate into decreased demand for intermediate consumption which indirectly and negatively affects other economic sectors.

Table 5.*Percentage Changes in Volumes from BaU Path*

	Domestic supply		exports		imports		World demand for exports		Total intermediate consumption	
	SR	*LR*	*SR*	*LR*	*SR*	*LR*	*SR*	*LR*	*SR*	*LR*
agriculture	0.3167	0.270	-0.176	-0.330	0.271	0.28	0.25	0.26	0.2922	0.228
food	0.29	0.300	-0.027	0.027	0.017	0.016	-0.1032	-0.03	-0.033	-0.028
trade	-0.1395	-0.120	-0.13	-0.133	-0.017	-0.01	0.003	0.005		
manufacturing	-0.1288	-0.122	-0.328	-0.156	0.01	0.02	0.007	0.025	0.0292	0.0677
dairy			-0.057	-0.057	0.037	0.036	-0.0512	-0.05	-0.0326	-0.028
fertiliser	-0.0115	0.03	-0.1332	-0.02	0.231	0.323	0.007	0.022		
oils			-0.053	-0.053	0.009	0.01	-0.052	-0.051	-0.0223	0.033
vegetables	-0.063	-0.066	-0.072	-0.075	0.023	0.02	-0.022	-0.022		
fish	-0.068	-0.073	-0.076	-0.078	-0.022	-0.025	0.003	-0.005		
meat	-0.059	-0.06	-0.073	-0.075	0.029	0.025	-0.027	-0.027		

Source: Author's calculations, based on simulation results
Notes: short run (SR) refers to the year 2015 (start of simulation) and long run (LR) refers to 2025 (end of simulation)

Rural land distribution increased significantly crops grown by communal farmers. Domestic agriculture supply increase both in the short run and long run by 0.3167 and 0.270 respectively. Basically communal farmers demand non-export oriented agricultural products hence notable increase in food crop production in both periods. Other horticultural crops experienced a decline in production as small scale farmers tend to pull factors away from the export crops traditionally grown by commercial farmers. The decrease in export oriented crops can be observed by a sharp decline in agriculture exports volume mostly from agriculture subsectors both in the short run and long run. This decrease in exports was mainly due to decrease in output volume from the meat, food, oils and vegetables sectors. Limited output in

the agriculture subsectors means that farmers focus more on domestic supply.

Conclusions

Inequalities in resource ownership in more common in developing and emerging economies and evidence seem to suggest that this is the major cause of rural poverty and income inequalities. The reason is that poor households do not own the means to production hence are more prone to poverty. In line with these arguments, empirical literature point to the fact that rural land distribution can be effective on equity groups.

However, there is no strong evidence in many countries that rural land distribution will decrease poverty and improve income inequalities or guarantee that the poor people will always benefit. This inconclusiveness seems to suggest that such evidence from a particular country must be obtained empirically.

It is against this background that this thesis set out to empirically evaluate the potential impact of rural land distribution in South Africa. Particularly, this thesis contributes to literature in the following ways. Firstly, through the application of multiplier decomposition for detailed poverty analysis and this analysis provide relatively better estimates of the impact of rural land distribution in South Africa.

The thesis adds to the literature by applying a dynamic computable general equilibrium model for short run and long run impact of rural land distribution. Data for the study was obtained from the IFPRI social accounting matrix 2009 and several findings emerged for this study.

The analytical results show that transfer of land from commercial to small scale farmers lead to a decrease in output has negative consequences for other economic sectors through intersectoral linkages. The decrease in output leads to a decrease in factor remuneration which will translate into job losses and poor household income. The CGE simulation results also show that rural land distribution leads to an improvement in poor household's income in the long run. The simulation results indicate that rural land distribution has economy wide impacts on the demand, intermediate consumption and consumer prices

through intersectoral linkages. It also has consequences factor remuneration especially wages and leads to job losses and a decline in poor households' income. The study recommends minimal transfer of land coupled with government investment in agriculture. To minimize this negative impact there is need to design and implement agriculture policies to maintain agricultural productivity and one such policy is to increase government investment and increase irrigation facilities for the small scale farmers.

Policy recommendations

The simulation results showed that rural land distribution can lead to decrease in output in the agriculture sector, and the decrease in output has consequences for other sectors that are strongly interlinked with the agriculture sector. The consequences are strongly observed on factor remunerations especially, wages for agriculture low-skilled workers; hence, this can lead to decline in households income.

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5 The measurement of credit channel in the CEMAC zone

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Introduction

Modern nations are economically asserted because they produce more and better. The productive investment financing therefore appears as a categorical imperative, questioning both private agents and public decision-makers. The good distribution of credit for the improvement of financing conditions then appears necessary as a precondition for the establishment of a viable production sphere which is a growth bearer. This analysis highlights the significance of the monetary variable in the implementation of economic policy for the survival of African economies.

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The history of economic facts reveals that financing productive activities in most developed economies is operated through a dynamic bank credit during the Industrial Revolution. In a more recent period, lessons learned from the 2007-2010 global financial crisis have generated the entry into force of unconventional[i] monetary policies. Incentive mechanisms to the supply of bank credit called quantitative easing or credit easing are then increasingly used (Artus, 2014). Presently, central banks of developed countries such as Japan, the US and to a lesser extent, the European Union (EU), resort to such an expansionary monetary policy of easy credit known as "quantitative easing." These measures constitute a real revolution (Stiglitz, 2013) through which developing countries can get inspired, particularly those of the CEMAC Zone. These new strategies recognize the relevance of monetary policy and its influence in the real economic sector. An intervention of the Central Bank then places credit supply in the centre of such an intervention. However, this new context reveals that instruments commonly used by central banks do not seem to give full satisfaction in monetary policy transmission to the productive sector (Artus & Broyer, 2014).

In developing countries (DCs) on the contrary, the difficulty to access financing was formally identified as the main obstacle faced by companies, especially the Small and Medium size Enterprises (SMEs) which are more vulnerable to credits' scarcity (UNO, 2005).

The concern about monetary policy transmission to the CEMAC Zone productive sector is justified for a number of observations: the CEMAC Zone post-colonial financial system superficially reformed nowadays tends to orient credits towards trade rather than productive investment. Monetary cooperation agreements signed in 1972 between the French Treasury and the CEMAC member States negatively affect the monetary sovereignty of the Bank of Central African States (BEAC) according to Guillaumont & Guillaumont (1984). Several financial institutions specialized in development financing in the BEAC zone experience bankrupt after the 1980s' economic crisis. Secondary banks that escaped bankruptcy and those created after the financial system restructuring remain very cautious in terms of credit supply. They are reinforced in this cautious attitude by a restrictive monetary

policy from the BEAC. The financial liberalization of the 1990s led to the abandonment of credit direct control instruments in favour of indirect instruments. They no longer give room to the government to direct bank credit supply towards promising growth activities.

Economic growth is neither found in the BEAC status nor in the Convention governing the Monetary Union of Central Africa (UMAC), thus reflecting the negligence of production financing.

Several reports and studies[ii] reveal, if not, the failure[iii] or at least, the limits of the old funding policies such as public aid to African Development (PAD), foreign direct investment (FDI), the international debt of developing countries (Ngango, 1967) and the initiative for Heavily Indebted Poor Countries (HIPC) (Sogge, 2003).

Therefore, to overcome the shortcomings observed in credit market and to favourably and sustainably influence the economic activity, public authorities generally make use of two main economic policy instruments: monetary policy and fiscal policy. In particular, monetary policy is able to act on economic financing conditions to correct credit market imbalances (Mishkin, 2010). The choice we make on monetary policy is then justified by its malleability and flexibility which demarcates it from heaviness inherent to the implementation of fiscal policy.

Most studies have often considered monetary policy transmission channels as passive and incidental mechanisms. Credit channel is therefore not seen as an endogenous mechanism for facilitating production financing, hence the significance and relevance of our study. The issue developed here on production monetary financing by credit channel under the leadership of the Central Bank then has a dual theoretical and empirical interest.

Theoretically, it contributes to both the renewal and extension of the economic thought with an application within the framework of a monetary union in developing countries. Regarding the renewal of thought, the Keynesian circuit theory and that of the post-Keynesian monetary economy of production, they are on the agenda as far as production financing is concerned. Both theories are therefore of remarkable significance to us because of the limitations and incompleteness of financial markets revealed by

financial changes experienced by developing countries in general, and those of the CEMAC Zone in particular. These are recent crises which different solutions have consecrated the "resurrection of Keynes." Regarding the monetary thought extension, credit channel which until then was considered as a passive transmission mechanism of monetary policy to real economy, is envisaged as part of this work, as an active tool stimulating productive investment at the disposal of policymakers. Similarly, we would like to make a second extension in our analysis: from the post-Keynesian "production monetary economy" to a "production monetary policy". This is a monetary policy based on the currency-credit-production triptych to focus its action towards the search for economic growth.

Empirically speaking, bank credit is still of paramount significance in corporate finance process, companies being economic engines in developing countries which often lack efficient capital markets such as stock exchanges. And even though the latter exist, most Small and Medium size Enterprises (SMEs) and Very Small Enterprises (VSEs) have no access to market financing (shares, bonds).

A credit channel study in the BEAC Zone allows highlighting the malfunctions, nature and optimal architecture of financial system, that is to say, the share which belongs to the bank and market financing respectively (Pollin & Vaubourg, 1998). The question of credit channel's effectiveness in production financing is particularly noteworthy that recent international financial crises and mutations led to reflect on the new role of central banks as well as the best types of financing to be adopted by various economies. The current debate between the Federal Reserve's (FR) strategy and that of the European Central Bank (ECB) for funding or growth is indeed edifying, giving to our study its whole present nature.

Finally, lessons learned from the 2007-2010 global financial crisis drew particular attention on monetary policy transmission. The blocking of transmission channels has revived the debate on the economic activity financing with particular emphasis on credit channel (Artus, 2014). Central banks therefore seek to "fix" these faulty transmission mechanisms (Marchal, 2013). Regarding

Developing Countries and particularly those of the CEMAC Zone, after observed the mitigated results of the Structural Adjustment Programmes (SAPs) and an unsustainable external debt, they are engaged in a search logic of very high growth rates for economic emergence and poverty reduction. It is therefore appropriate for them to make use of all economic policy instruments at their disposal (including monetary policy) to achieve these legitimate long or short- term goals.

Moreover, the mastering of policy transmission allows ensuring that it actually reaches the real economy. This transmission issue is still particularly very acute in the implementation of monetary policies in Africa (IMF, 2014). Finally, a good command of credit channel by the CEMAC countries may not only contribute to high growth rates achievement, but also, to the consolidation of productive sphere and the diversification of their economies. These are few prerequisites for these countries to ensure their economic emergence as well as their inclusion in the very competitive globalization process.

Thus, the main objective of this work is to assess the CEMAC Zone monetary policy transmission through credit channel. To achieve this goal, we will first highlight the various monetary policy transmission channels usually presented in economic literature, while discussing their relevance within the framework of the CEMAC monetary policy. This discussion will allow us to assess the most appropriate channel of the BEAC monetary policy transmission. Thereafter, we will proceed with the evaluation of the selected channel by measuring its parameters (width, depth, speed and time), using causality tests and autoregressive vectors (VAR). Economic policy recommendations will be formulated based on results obtained to improve the transmission efficiency of monetary policy in the zone.

Monetary policy transmission channels: A brief literature review

Economic literature distinguishes a multitude of transmission channels of monetary policy that can broadly be reduced to three (3): the interest rate channel, the channel for other assets' prices (stocks, bonds, and currencies) and credit channel (Mishkin, 1996).

Furthermore, the financial system's architecture of Central Africa (most predominantly of bank financing at the expense of market funding) led to be interested in credit channel. The mastery of this transmission mechanism would allow the monetary authority of this zone to ensure effective allocation of financial resources to the real economic sector.

In an economy without an efficient financial market, this approach led to be interested in the ability of monetary policy to affect (decisions) bank credit supply so as to give significant impetus to the financing of the real growth generating activity.

Good monetary policy transmission contributes to "... ensure a long-term growth of money and credit aggregates consistent with output potential growth in order to promote a maximum employment level, stable prices and moderate long-term interest rates" (Mishkin *et al.*, 2010, p. 602).

Now in-between "Science and the Central Bank's art", it implies a sound decision-making allowing secondary banks to provide sufficient liquidity for optimal allocation of credit financial resources in economy (Bordes, 2007).

Currency is required not only for transaction, precaution and speculation purposes. It is also much needed for "financing motive"[iv]. This refers to the need for a forward advance of required currency to concretize current investment decisions.

The existence of information asymmetries, nominal rigidities and hysteresis's[v] effect determine the incompleteness, or even the failure of the financial market. These patterns provide a full effectiveness to monetary policy and thus its transmission to real economy (Pollin, 1999). Recent analyzes, while questioning the monetarist doctrine, placed production financing at the centre of their concerns (Artus, 2014; Kaldor, 1985; Taylor, 1995; Blanchard & Gali, 2007). Ireland (2004) also shows that through a judicious credit supply, currency can be introduced in the real cycle analysis because of its crucial role in the financing of real activity.

In this perspective, banks are seen as key institutions for their money creative and distributive liquidity function in economic financing process (Kashyap *et al.*, 2002). They create money in exchange of loans granted to companies based on profitable projects. Companies invest to produce. This production will justify

ex-post the creation of the ex-ante currency. Money created is thus an anticipation of future production; this is credit money. The interest we then have on credit channel comes from the fact that other transmission channels do not cope with the operating efficiency conditions in the CEMAC zone. This goes with the interest rates channel and other assets' prices channels (stocks, exchange rates, housing price and land price).

Limits to other monetary policy transmission channels' effectiveness in the CEMAC Zone

The relevance of credit channel study for the CEMAC Zone highlights the applicability limits of other transmission mechanisms namely the interest rates' channels and those of other assets' prices.

The interest rates channels' limited scope

The Keynesian channel of interest rate which the IS-LM model is a reference implies that an expansionary monetary policy marked by an increase in money supply ($M\uparrow$) induces a decrease of real interest rates ($i_r\downarrow$). This reduction in capital cost increases investment expenditures ($I\uparrow$) which generate (through a multiplier effect) an overall increase in production ($Y\uparrow$).

Considering the Fisher's relation in which the nominal interest rate is equal to the sum of the real interest rate i and the inflation rate π^e, a growth in money supply ($M\uparrow$) is likely to raise the level of expected price ($P^e\uparrow$) and thus the anticipated inflation ($\pi^e\uparrow$), consequently causing a reduction in real interest rates ($i_r\downarrow$) and stimulating investment through the interest rate channel. The interest rate's channels as described imply a significant and automatic effect of money supply's increase on interest rate. However, this reaction is not always verified in the CEMAC zone. Indeed, interest rates formerly administered until their liberalization in 1990, lending rates since then freely negotiated between banks and borrowers are no longer an indicative variable for monetary policy. Changes in market's interest rates are less the result of monetary policy that banks' discretionary decisions rely on the borrowers' quality as well as their negotiating power.

Artus (2014) also shows, inspired by EU data that monetary policy based on interest rates are no longer effective [vi]. In addition, numerous studies, including that of Bernanke & Gertler (1995) showed that empirical studies found it very difficult to detect a significant incidence of interest rates through capital cost. They consider that the failure of interest rates in impulses' transmission from the Central Bank encouraged the search for other mechanisms, notably credit channel (Mishkin, 1996). Moreover, in the relationship between interest rate i and investment I, investment elasticity with respect to interest rate is not guaranteed, hence the need to resort to credit channel.

The structural blockage of other assets prices' channels: exchange rate and Tobin's q

Meltzer (1995) after Modigliani (1971) considers other assets' prices (exchange rates and share prices) as fundamental in monetary policy transmission.

Exchange rate channel's efficiency

Theoretically, exchange rate channel implies that a decrease in domestic real interest rates reduces attractiveness of domestic deposits in national currency, compared to deposits denominated in foreign currencies, and this results in a fall of deposits in national currency's value compared to foreign currency deposits. What follows is a depreciation of national currency (**E**↓) which induces a decrease of domestic goods' prices in foreign currency, resulting in an increase in net exports (**NX**↑) and consequently, an increase in the overall production (**Y**↑).

However, in the CEMAC Zone, this channel is experiencing a fatal hindrance due to the practice of fixed exchange rate set by monetary cooperation agreements between the CEMAC States and France, the former colonial power. Unlike the generalization of floating exchange regimes in the 1980s, the CEMAC countries have remained in fixed exchange towards specific monetary relationships they have with the French Treasury, and which had not work without causing monetary sovereignty problems to these countries. This transmission mechanism thus undergoes a structural institutional blockage, and can no more regularly acts enough to allow a stimulation of economic financing. At the same

time, it raises the issue of monetary sovereignty found in the "inconsistency triangle»[vii]. In virtue of this, openness to foreign market is such a way that countries not controlling capital's movement cannot effectively conduct autonomous monetary policies. In this case, an economy cannot simultaneously have a fixed exchange regime, an autonomous monetary policy and freely release capital (financial integration).

The limited game of stocks' price channel: the Tobin's q

Monetary policy acting through the stocks' price channel is transmitted on investment thanks to its effects on "Tobin's q" coefficient on the one hand, and on consumer's wealth on the other.

As concerns the Tobin's q coefficient (1969), it is defined as the ratio between companies' market value and capital renewal cost. Thus, there is a positive linear relationship between the Tobin's q and corporate investment. An expansive monetary policy raises the stocks' price (Pa) which in turn increases the Tobin's q coefficient, thus provoking an increase in companies' investment expenditure (I), and consequently an increase in output (Y). Unfortunately, the relevance of this mechanism is not established within the CEMAC zone where financial markets remain underdeveloped. At least, it could be very low, as only three companies are listed in Douala[viii] Stock Exchange; the Central Africa Stock Exchange (BVMAC) located in Libreville, Gabon, being not much advanced[ix]. Furthermore, the relationship between the Tobin's q and investment expenditure I is insignificant. In the absence of an efficient stock exchange, this channel appears ineffective. Therefore, monetary policy cannot pass through stocks' price to effectively convey its effects in the productive sector.

The stocks' price channel acts on consumption through wealth's effects. This channel has been highlighted by Modigliani (1971) in his life cycle model. He shows that consumption expenditures are determined by consumers' resources throughout their lives. These resources consist of human capital, physical capital and financial wealth - or heritage. The shares are thus considered as a major component of financial wealth. Also, when the stocks' price increases, the value of this financial wealth rises, the overall consumers' resources during their lifetime also increase and

consequently their consumption. However, given the households' low income, the embryonic state of the CEMAC zone financial markets as well as the very low participation of SMEs in the sub-regional stock exchange, this mechanism also remains limited, and cannot be an effective transmission tool of the BEAC monetary policy to the real sector.

These channels being ineffective to optimally transmit the CEMAC zone monetary policy, it is appropriate to focus on credit channel which parameters will therefore be measured.

Theoretical Justification of Credit Channel

Based on microeconomic arguments such as information asymmetry, nominal rigidities and market incompleteness[x], the New Keynesian Economy notes the market failure, hence the need and monetary policy effectiveness in financial contracts conclusion. Its main proponents, Akerlof (1970), Stiglitz & Weiss (1981), Mankiw (1986), Greewald (1995), Yellen & Romer (1990) agree on two fundamental points: currency is not neutral; market imperfections lead to non-optimal financial contracts, the need for public intervention to correct bank credit market failures. Theoretically speaking, credit channel is based on the idea that monetary policy leads to bank portfolio shifts which lead to bank credit possible change. Credit channel acts as follows: an expansionary monetary policy (for example) which helps to increase reserves and bank deposits, increases the volume of available bank loans. This increase in loans leads to a rise in investment spending (and eventually of consumption), resulting in an increase in economic activity (Mishkin *et al.*, 2010).

Credit channel can be in two forms: broad credit channel or financial accelerator, and narrow credit channel also called bank credit channel. Broad credit channel implies that there are borrowers who, due to their rather large financial sphere, can access other financing forms than bank credit. The debate on monetary policy transmission to real economy has recently been revived in the early 2010s by Artus & Broyer (2014) who find that after the 2007-2010 financial crisis, no transmission channel no longer works in the Euro zone. This issue had already brought some interest ten years ago in United States, Europe (McCallum,

2004, Mishkin, 1994) and in developing countries (DCs). Monetary policy may affect real economy through the availability and terms of granting loans by banks (Villieu & Lavigne, 1996). The influence of credit dynamics on growth and economic development had already given rise to numerous studies. Thus, Schumpeter (1911, 1923) considers financial institutions as a prerequisite for technological innovation underlying growth. Financial intermediaries thus form the cornerstone of new questions about the monetary policy transmission mechanisms (Villieu & Lavigne, 1996). It should be noted that credit analysis as monetary policy transmission mechanism makes its way from Tobin & Brainard (1963) investigations. In this same approach, Romer & Romer (1989) establish that a restrictive monetary policy reduces the money supply (M2), and leads to a contraction of bank credit. What follows is a fall in investment which depresses the economic activity.

Bernanke[xi] & Blinder (1992) on the one hand, Kashyap & Stein (1993), on the other examine, in the American context, the influence of monetary policy on bank credit supply, and show the existence of a bank lending channel. Lavigne & Villieu (1996) make the distinction between broad and narrow lending channels. They also present an evaluation process of the lending channel through the autoregressive vectors' method (VAR). Guille (1996) presents an analysis on the influence of information asymmetries in monetary policy transmission through the lending channel. Goux (1996) conducts an empirical verification test on credit narrow channel in France, and shows that it is possible to measure the width, depth and flow rate of bank lending channel. Joseph (1996) observed in the case of Cameroon, the extent of bank credit rationing, and presents the criteria - however disincentive- of banks' credit supply.

Investigations within the CEMAC framework show that banks in the BEAC zone, though restructured and because of their atomicity, seem unprepared for development financing and globalization challenge (Bekolo-Ebe 1998, Okah- Atenga 1998). Similarly, more recent studies show that the CEMAC financial sector has been remediated, and that banks have become profitable and have more excess to liquidity (Avom, 2006). But the financial

system highly segmented is still unable to finance development (Hugon, 2007).

Finally, it appears that "a significant consequence of bank lending channel is that monetary policy has a strong impact on Small Enterprises' expenditure. They are more dependent on bank loans than large companies. The latter have direct access to capital markets without any solicitation from banks" (Mishkin et al., 2010, p. 836). To study and make use of this channel may prove itself beneficial for developing countries, especially those of the CEMAC zone which productive sphere consists mainly of Small and Medium Enterprises.

Credit channel assessment in the CEMAC zone methodological approach

To assess credit channel in this context is to quantify the width, speed, depth, and time limit, using statistical and econometric techniques applied to monetary policy transmission variables. This requires two types of tests: those which are prerequisites for the VAR usage (stationary test and cointegration test) and those which assess credit channel's depth, speed, width and time limit (causality test and VAR test). The VAR model predictive power used in our analysis helps to measure the direction, magnitude and duration with which a monetary impulse affects macroeconomic variables (Friedman, & Schwartz 1963; Sims 1980; Lavigne, Villieu 1996). This method therefore facilitates the forecasts as far as monetary policy decision-makings are concerned. The auto-regressive vector's estimate will therefore be done from consolidated data from six countries of the Monetary Union of Central Africa (UMAC).

There is abundant literature on how to assess monetary policy transmission acting through financial variables. It can be mentioned for this purpose, the Bernanke & Blinder (1992) investigations, those of Friedman & Kuttner (1992). Moreover, empirical works on monetary policy implementation oriented towards the financing of nominal Gross Domestic Product were done by Taylor (1985, 1993); McCallum (2004, 1988, 1990); Motley & Judd (1991); Hess & Brayton (1992) and Feldstein & Stock (1994). Though based on the evolution of financial variables' analysis

which is part of credit channel constitution, the monetary policy transmission model we are trying to build heavily relies on economic theory developed up to date on the financial sector integration to real economy.

This model which targets production through credit channel is built from two economic principles: the first refers to the theory targeting production (which impact variable here is the GDP's aggregate) from an action on money supply. Broadly speaking, this is M2 retained as instrumental variable. In fact, there is a stable explanatory link between money supply M2 and nominal GDP (Feldstein & Stock, 1994) such that we have: GDP = f (M2).

The second principle on which we rely in the construction of our model addresses the Keynesian transmission mechanism as concerns monetary policy through credit channel in situation of information asymmetries (Lavigne, & Villieu 1996; Mishkin, 1994) or under the use of the IS-LM model by introducing credit therein (Bernanke, & Blinder, 1988). These various studies have shown that an increase in money supply due to an expansive monetary policy increases bank deposits. What follows is an increase in credit supply which induces investment growth, thus resulting in production's expansion.

To estimate the monetary policy real effects, the empirical research often borrowed three methodological directions (Lavigne & Villieu, 1996). These include the structural models, the auto-regressive Vectors' models (VAR) (Friedman & Schwartz 1963; Sims, 1980) and qualitative information (Romer & Romer, 1990). The approach used in this work extensively uses qualitative information. But, it is completed with autoregressive vectors' analysis. This refers to time series econometrics which consists of observing the historical evolution of statistical variables' series, and identifies the causal link they may have each other. By so doing, it is possible to identify explanatory closed and stable relationships between these various economic and financial variables involved. The VAR method helps to detect these types of relationships among which those expressing plausible economic behaviours are chosen, based on economic theory.

Our approach is therefore not a priori based on an existing economic model, but rather on observation of facts revealed by

statistical data on macroeconomic aggregates that make up the credit channel. However, we have presumptions on a possible configuration of relationships between monetary policy instruments and objectives from economic theory as reflected in Bernanke & Blinder (1988) model. These relationships involve the sequential succession from cause to effect, variables' response in monetary policy transmission process by credit channel towards production's target. Based on statistical tests' results, we seek to measure credit channel's parameters, which is a transmission privileged mechanism of the BEAC Zone monetary policy.

Any monetary policy instruments' manipulation leads to a rapid change in money supply (Ramey, 1993). The latter thus appears as a key indicator both in monetary policy management than in its transmission in real economy (Mc Callum, 2008, 2005; Brunner, 1968). That's why we chose M2 as a monetary policy indicator variable for the BEAC. The choice of this monetary aggregate holds moreover, to the adoption by the BEAC, of money supply increasing standards policy, which consists in acting in fixed rule to determine ex ante the growth rate of the amount of money in economy. This mechanism is fundamentally based on banks' money creation function, following a credit multiplier process. With money supply (M2); Investment (INV) and Gross Domestic Product (GDP), we can diagram credit channel as follows [xii]:

$$M2 \uparrow \Rightarrow Credits \uparrow \Rightarrow INV \uparrow \Rightarrow GDP \uparrow$$

Using the VAR method, the existence of direct or indirect links between specified variables in this monetary policy transmission channel (bank lending channel) can then be verified. And using the time series econometric method, we can also observe the historical evolution of these variables, taking into account the causal relationships relative to each other. Meaning and intensity of each causal link are revealed between two variables by Granger's test (1969). This analysis helps to induce an explanatory relationship between credit channel variables, using autoregressive vector's tests which enable to induce the overall production's (GDP) regression. We then express the global output according to other

aggregates and their own past values, following different correlations selected from the VAR test. The latter effectively allows obtaining these correlations while indicating their respective meanings and intensity.

GDP appears in this context as the main target to be reached by monetary policy. We don't ignore other models which target output's inflation and growth (Taylor, 1993). However, we would like to lay emphasis on credit role in monetary policy transmission mechanism in developing economies such as those of the CEMAC Zone, using the VAR tool. Tests made directly relate to aggregates from monetary statistics; here, we use the BEAC annual data and those of the African Development Indicator (ADI) of the World Bank. This clarification being given, we can carry out the mathematical formulation of the VAR process.

Mathematical Formulation of the VAR

Given a vector Y_t consisting of k endogenous variables representing the studied economy, the VAR model with k variables and p shifts also called autoregressive model of order p [Ar (p)] can be written:

$$Y_t = a_1 Y_{t-1} + \ldots + a_p Y_{t-p} + \mu + \varepsilon_t. \quad (1)$$

Taking into account the influence of other explanatory variables on Y_t , then we find ourselves in the general case with an equation:

$$Y_t = a_1 Y_{t-1} + \ldots + a_p Y_{t-p} + b_1 X_{1t-1} + \ldots + b_2 X_{mt} + \mu + \varepsilon_t \quad (2)$$

Where X_i are exogenous variables which can be delayed. The structural VAR helps to obtain the reduced VAR:

$$Y_t = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_P Y_{t-P} + \eta_t \quad (3)$$

Where $\eta_t = B_o^{-1} \varepsilon_t$ is a linear combination of structural shocks following a normal distribution $N(0, B_o^{-1} B_o^{-1})$.

The use of the VAR model will then help to estimate a transmission function reflecting credit channel's measurement in the form of the multiple regression model below:

$$GDP_t = \beta_0 + \beta_1.M2 + \beta_2.CRI_{t-i} + \beta_3.CRP_{t-i} + \beta_4.INV_{t-i} + \beta_5.GDP_{t-i} + \varepsilon_t$$

with i the number of years shifted to be determined for each variable as a result of causality tests and β_i the regression coefficients to estimate. Monetary policy transmission variables through credit channel are: broadly speaking the money supply (M2); the domestic credit (CRI); the private sector's credit (CRP); total investment (INV); the nominal Gross Domestic Product (GDP). Causality tests' interpretation and VAR thus presented will help to measure the different credit channel's parameters.

Findings and discussion

The tables below present cointegration and stationary tests' results of the studied variables:

Table 1. *Stationary test's results on credit channel's variables in the CEMAC Zone*

Variable	M2	CRI	CRP	INV	GDP
Order d'intégration	I(1)	I(1)	I(1)	I(1)	I(1)

Source: Authors' estimates from the BEAC annual data and those of the African Development Indicator (ADI).

It shows that all community variables' series used are stationary and integrated of order 1. In other words, the level of the studied variables in current year depends on their previous year level. It can therefore be envisaged a stable long-term or cointegration relationship between the CEMAC zone credit channel's variables. The table below which presents different Johansen's cointegration tests shows that M2, CRI, CRP, INV and GDP series are all cointegrated of order 1, this at 95% confidence level (see cointegration test table in appendix), thus confirming the specification of long-term and stable relationships between the studied variables.

Table 2. *Johansen's cointegration test results*

Eigenvalue	Likelihood ratio (LR)	Critical Value (CV) at 5%	Critical Value (CV) at 1%	Number of supposed CE
0.805356	136.4105	87.31	96.58	None **
0.464438	70.94709	62.99	70.05	At most one **
0.418618	45.96958	42.44	48.45	At most two *
0.286021	24.27567	25.32	30.45	At most three
0.236613	10.79961	12.25	16.26	At most four

Note: The stars * (**) designate the non-cointegration hypothesis's rejection and therefore the acceptance of cointegration at 5% (1%) and CE the number of supposed cointegration equations.

The possible causal link between variables was performed using the Granger's (1988) test. Indeed, according to him, X "Granger cause" Y, if Y can better be predicted from the past of Y and X rather than from the past of Y only. The test results are shown in table 3:

Table 3. *Granger's bivariate causality test: null hypothesis, Ho: X does not ("Granger cause" not Y.)*

X/Y	P (1 delay)	P (2 delays)
M2 / CRI	0.05982	0.12558
CRI / M2	0.05823	0.57459
CRI / INV *	0.61661	0.02105 *
INV / CRI	0.01268	0.00278
INV / GDP	0.47304	0.97928
GDP/INV	0.09469	6.0E-06
M2/INV	0.46548	0.98577
INV/M2	0.00057	0.00841
CRI/GDP	0.13981	0.82695
GDP/CRI	0.01412	0.00714
M2/GDP*	0.00419*	0.00235*
GDP/M2	5.4E-08	1.4E-06
M2/CRP	0.40262	0.24444
CRP/M2	0.47402	0.47591
INV/CRP	0.13814	0.62746
CRP/INV*	0.03529*	0.07843
CRP/GDP	0.05997	0.20186
GDP/CRP	0.19056	0.03334

Source: By ourselves, based on BEAC data.

Note: The table's values indicate the probability P associated with Fisher's F testing coefficients' nullity hypothesis of Y regression in X. A low figure (below 5%) identified in bold, indicates that the risk to wrongly reject the null hypothesis is low and therefore, causality can be accepted. We selected the 1 and 2 delays for convenience reasons, with the VAR used next and because variables' series are

annual. The star * designates the interesting causalities for monetary policy transmission.

It appears that domestic credit (*CRI*) causes investment (*INV*) according to Granger's view with a delay of two years and an error risk of 2.1% only (*CRI* ↑ ⇒ *INV*↑). The private sector's credit (*CRP*) causes investment (*INV*) according to Granger's view with a delay of one year and a negligible error risk of 3.5% (*CRP*↑ ⇒*INV*↑). This result confirms the choice of the private sector's credit (CRP) as credit channel transmission variable because it acts quickly and positively (one year) on investment than domestic credit. The different causal relationships detected can then be analyzed and interpreted in terms of credit channel's measurement according to Mishkin's (1996) perspective.

Money supply M2 causes nominal GDP according to Granger's view with a delay of one year or two (M2 ↑ ⇒ GDP↑). Though these results are all interesting, we will retain the most significant, namely money supply's direct influence on GDP with a delay of one year. This result is an empirical confirmation of economic theory as reflected in Brunner's (1968), McCallum's (2008) and Taylor's (1985) works, and especially those of Feldstein & Stock (1994) which establish the existence of a strong and stable relationship between money supply M2 and nominal GDP. They conclude that money supply M2 can validly be used as indicator variable for monetary policy because it has a significant explanatory power on real economic activity represented by the GDP's ultimate objective. That's why we chose M2 as monetary policy indicator variable.

Credit Channel Parameters' Analysis in the CEMAC Zone

Credit channel's width in the CEMAC Zone

Credit channel is said to be wide when the financial system offers borrowers the double opportunity to get funding they need, either from banks as loans or from financial market through the issuing of shares or bonds. This situation implies a perfect substitutability between bank loans and bond debt. Concretely speaking, bank credit supply should be compared to market

financing (channel width). Credit channel remains narrow in the CEMAC zone. The Monetary Union of Central Africa (UMAC) financial system's architecture reveals that more than 91% of funding as far as the region's economies are concerned still comes from bank loans, and less than 9% from financial markets only (Central Africa Stock Exchange in Libreville, and Douala Stock Exchange in Cameroon). Indeed, in October 2014, domestic credit supply amounted to 6,001 billion CFA francs, while market capitalization of the zone is 626 billion CFA francs[xiii]. This situation forced companies to almost exclusively rely on bank credit for their external funding. Taking advantage of this privileged position, banks require a significant premium which value is a decreasing function of the ratio: amount of pledgeable wealth / amount of external funding (Bernanke & Gerttler, 1989). Richest companies remain privileged in this financing system. Most SMEs are therefore evicted from credit market, even though they make up the CEMAC's essential productive tools. Face to such financial architecture, monetary shocks are propagated through external financing cost insofar as external financing premium borne by borrowers depends on their financial situation.

Credit Channel's outflow in the CEMAC Zone

Credit channel's outflow is the Central Bank's own ability to influence bank credit supply. It is revealed by credit aggregates' reaction degree to the Central Bank's impulses. It is established through causality test between monetary policy's (M2) indicator variable and bank credit supply represented by credit aggregates (CRI and CRP). The strength of this causal link can be confirmed by the VAR test (Mishkin, 1996; Goux, 1996). Causality test reveals a lack of influence of money supply (M2) on bank credit supply (CRI or CRP) in the CEMAC zone. Money supply M2 does not cause domestic credit as far as Granger's view is concerned. Therefore, the Central Bank's decisions in any way do not affect banks' credit supply. Their arbitrages in favour of credit supply's increase or reduction would therefore be primarily made based on banking firms' microeconomic behaviour oriented towards maximizing their profit. It is said in this case that credit channel has a low speed. Monetary authorities do recognize this shift. "In

principle, because there is a gap between the monetary authority's will and reality on the banking field". All kinds of manipulations are found in banks to override the Central Bank's[xiv] decisions.

Credit Channel's Depth in the CEMAC Zone

Credit channel's depth designates the most sensitive credit aggregate in the Central Bank's monetary policy (Goux, 1996). The next step is to identify among credit aggregates present in economy, the most sensitive one to the Central Bank's impulses (channel depth). This aggregate is, in this case, the key variable for monetary policy transmission through credit channel. We have selected two credit aggregates to be tested: the domestic credit (CRI) and private sector's credit (CRP). Although causality from Granger's view between monetary aggregate M2 and credit aggregates (CRI and CRP) is not statistically established, it is noted however from the VAR's simulations that credit to the private sector (CRP) more fully reacts than domestic credit (CRI) to the Central Bank's impulses represented in this context by M2 variations. Thus, it can be logically argued that credit's depth is represented by the private sector (CRP) which is more sensitive to the BEAC monetary policy. Credit aggregate to be selected in monetary policy transmission model within the Monetary Union of Central Africa (UMAC) is the private sector's credit (CRP). Thus, this is what credit channel's depth in the Union is all about.

Credit channel time limits in the CEMAC Zone

Credit channel time limit is the reaction period of the GDP to the Central Bank's impulses. Causality's and VAR's tests help to determine this time in terms of the number of shifted periods based on how data used are monthly, quarterly or yearly. Credit channel will be most effective in such a way that its effects will be quickly felt on real economic sector. In addition, Friedman (1948) distinguishes internal and external time limit. The first refers to the required time for an economic issue to be known, the choice of an instrument and its implementation. The second materializes the required time for an instrument's modification effects to be felt on the targeted economic policy final goal. Empirical studies reveal that these credit channel time limits are 9 months on average as

concerns the United States (Romer & Romer, 1993), and 12 months for France (Goux, 1996). The use of causality tests only in this work, to explain the BEAC monetary policy transmission is proved insufficient. We therefore completed them with the autoregressive Vector's analysis presented in the table below, which reveals a two-year period between the shock on money supply and the GDP reaction in the UMAC case:

Table 4. *V.A.R Results and UMAC test*

Period 1960-2012 Number of observations: 52 Standard deviations and Student t Statistics (in parenthesis)					
	M2	CRI	CRP	INV	GDP
M2(-1)	0.686484	0.746151	14.93337	-0.526342	0.117850
	(0.35282)	(6.04418)	(33.3440)	(0.48480)	(1.10301)
	(1.94568)	(0.12345)	(0.44786)	(-1.08569)	(0.10684)
CRI(-1)	0.001740	0.511206	-1.386699	-0.016126	0.033006
	(0.01140)	(0.19527)	(1.07723)	(0.01566)	(0.03563)
	(0.15261)	(2.61800)	(-1.28729)	(-1.02964)	(0.92624)
CRP(-1)	0.001473	0.013809	0.949237	0.002063	0.001241
	(0.00222)	(0.03795)	(0.20936)	(0.00304)	(0.00693)
	(0.66503)	(0.36388)	(4.53408)	(0.67776)	(0.17925)
INV(-2)	-0.105982	-2.469272	-8.295943	-0.227330	0.085126
	(0.12394)	(2.12321)	(11.7132)	(0.17030)	(0.38747)
	(-0.85510)	(-1.16299)	(-0.70826)	(-1.33486)	(0.21970)
GDP(-1)	0.101832	.511016	7.295286	0.579809	1.429256
	(0.09763)	(1.67253)	(9.22688)	(0.13415)	(0.30522)
	(1.04301)	(0.90343)	(0.79066)	(4.32200)	(4.68267)
C	-155.8217	-1806.171	-3702.102	-245.2649	-82.30050
	(95.5518)	(1636.88)	(9030.22)	(131.294)	(298.717)
	(-1.63076)	(-1.10342)	(-0.40997)	(-1.86806)	(-0.27551)
R^2	0.985666	0.965932	0.964649	0.984462	0.995045
R^2 ajusted	0.980724	0.954184	0.952459	0.979104	0.993336

Source: Our findings from BEAC data (2013) and those of the World Bank (WDI, 2012)

Reading the table: The various credit channel's variables are presented in columns, assuming each of them is individually explained by other variables taken as delayed endogenous submitted online. Online are explanatory variables or delayed endogenous. In bold are indicated the reaction coefficients of various variables in relation to each other. The table above only retains significant relationships between the model's variables; some lines have therefore been deleted (the complete VAR table in available from the authors).

The different coefficients obtained from the VAR test are used to construct the following model[xv]:

$$GDP_t = 0.118M2_{t-1} + 0.033CRI_{t-1} + 0.001241CRP_{t-1} + 0.085INV_{t-2} + 1.429GDP_{t-1} - 82.30 + \mu_t$$

(1.10301) (0.03563) (0.00693) (0.38747) (0.30522) (298.717)

(0.10684) (0.92624) (0.17925) (0.21970) (4.68267) (-0.27551)

$R^2 = 0.99$; $F = 582.33$

Fisher's statistics reveals the global significance of the model ($F = 582.33 > F_{5/34} = 3.71$) and coefficients obtained all have the expected signs, thus materializing a favourable reaction of the GDP to financial variables. However, the coefficients' individual significance shows that only the GDP delayed on a period (GDP_{t-1}) is significant; in other words, to predict the overall GDP in the CEMAC zone as a whole, one can mainly only rely on its previous year level.

The Akaike's and Schwarz's tests results presented in table 5 enable to determine the maximum number of delays that can be retained on explanatory variables.

Table 5. *Number of Delays Following Information Criteria (Akaike and Schwarz)*

Delays	Akaike	Schwarz
1	78.48081	79.73465
2*	78.438	80.76027
3	78.09002	81.50246

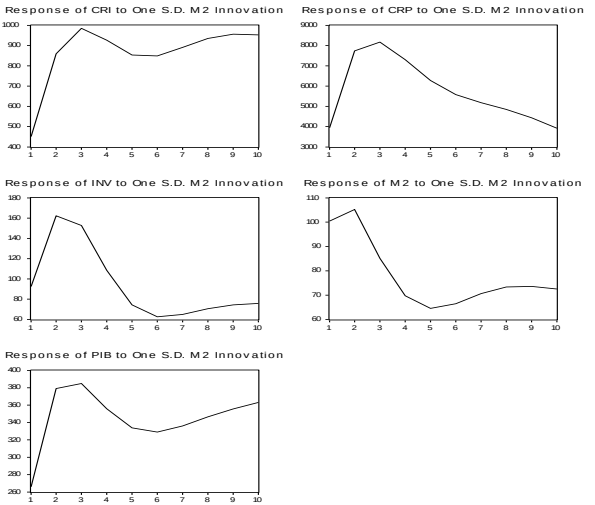
Source: Our results

We chose the shift number 2 because it provides the most expected coefficients in the model. More specifically, investment reacts with two periods (INV_{t-2}) of delay, while the other GDP explanatory variables ($M2_{t-1}$, CRI_{t-1}, CRP_{t-1}) react with a shift of one year only. Investment therefore reacts slowly in the CEMAC zone, that is, two years to induce production. This is a plausible period in view of the sub-regional economy's structure which burdens can't enable a faster response. The VAR model thus estimated helps to assess macroeconomic variables' response and sensitivity to the Central Bank's impulses through impulse response functions and the forecast error variance analysis of these variables.

Macroeconomic responses' assessment to monetary impulses: impulse response functions

The following graphs show the responses to shocks on structural residues of the five (5) variables used in the model. We

selected 3 monetary variables on which we simulated the shocks: money supply M2, domestic credit (CRI) and the credit to the private sector (CRP) which are the BEAC's monetary policy transmission variables.



Graph 1. *Response of Credit Channel's Macroeconomic Variables to a Shock on Money Supply M2*

In view of these figures, it is clear that an expansive monetary policy which results in an increase in money supply is followed by a number of effects on other economic and financial variables included in the model.

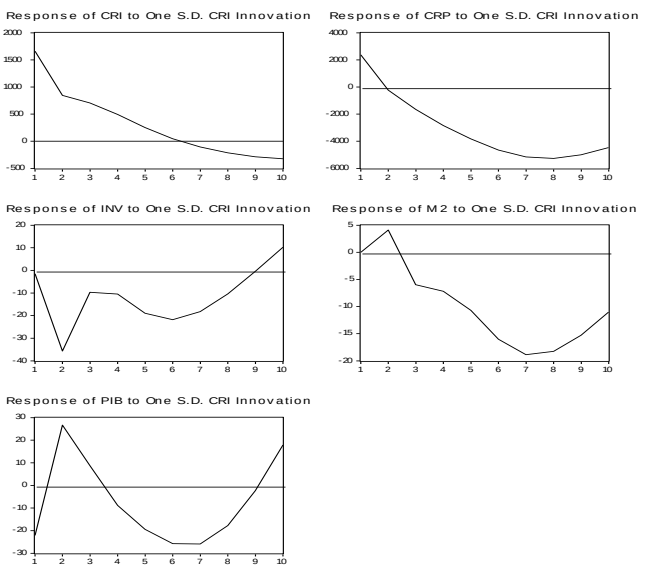
Thus, an increase in money supply leads to a rise on 3 years of the domestic credit CRI. This result means that an expansive monetary policy resulting in an increase in money supply leads to an increase in domestic credit in the UMAC zone as a whole. And all things being equal however, this impulse is maintained for a period of three years. It strengthens the causality presumption according to Granger's view which does not clearly appear in the causality test.

The effect of private sector's credit to increase money supply is positive. This effect is higher than that recorded in domestic credit. This amplifying impulse is maintained over three years before steadily decreasing up to the 10th year. Innovation impact on

money supply M2 is very important insofar as it leads to a positive result on private sector's credit which is often a growth- bearer. This result which had not been revealed by Granger's causality remains important in the BEAC monetary policy decision-making.

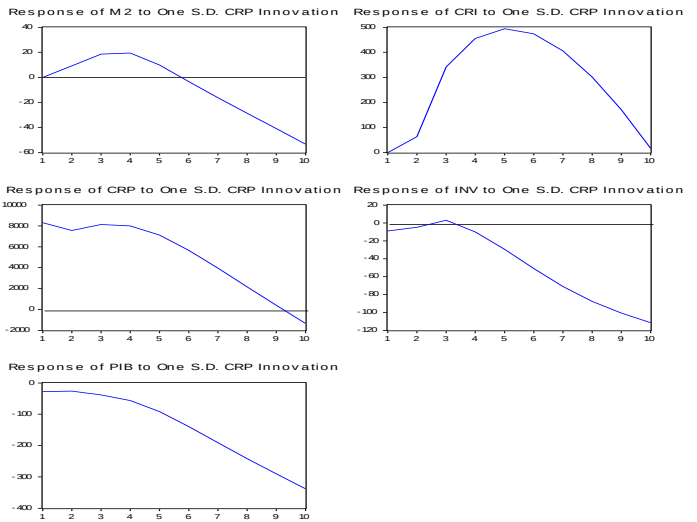
Investment positively responds to an impulse on money supply during a short period of one year. However, the effect remains positive. Then, it is amortized before being cancelled at the 6th year. This is a wealth effect which is more oriented on investment than consumption. Ensuring that there is sufficient liquidity in economy, the sub-regional States can give impetus to invest in SMEs and agricultural or industrial family firms to induce economic growth.

Finally, the nominal GDP widely and positively reacts to an impulse on money supply for a period of three years. This effect is reduced thereafter. This is the confirmation of Granger's causality test. These empirical results confirm the economic theory that monetary impulses are decisive in output changes, and that money supply is the surest index to measure these impulses provided they are properly controlled by the authorities (Brunner, 1968; Feldstein & Stock, 1994).



Graph 2: *Reaction of CEMAC economic aggregates to an impulse on domestic credit.*

Graph 2 above shows the magnitude, direction, and reaction period of economic aggregates to a pulse on domestic credit. Thus, a shock effect on domestic credit is felt on investment from the 2nd year, and though remaining negative, it is accelerated from the 6th year before experiencing a steady and sustained growth. A shock on domestic credit (CRI) acts positively on GDP over a year and a half. This effect regularly fades and is cancelled after 3 years.



Graph 3. *Reaction of CEMAC economic aggregates to a pulse on private sector's credit.*

Finally, graph 3 outlines the CEMAC macroeconomic aggregates' response to a monetary policy impulse on private sector's credit: a pulse on private sector's credit increases investment for 3 years before the effect begins to fall. This effect is however not very wide in the CEMAC zone as a whole. Furthermore, a shock on private sector's credit is very low on nominal GDP for 4 years before it steadily declines.

Measuring the UMAC real sector's sensitivity to BEAC monetary innovations: forecast error variance decomposition

When innovation explains a large part of the forecast error variance of a series, we deduce that economy is considered very sensitive to shocks affecting this series (Sims, 1980; Doan, 1992; Judge *et al.*, 1987; Goux, 1996). CEMAC economies' sensitivity to BEAC innovations can be analyzed by decomposing the forecast error variance of each of the variables used in the VAR model (M2, CRI, CRP, INV and GDP). This sensitivity aims at calculating, for each of the simulated innovations, its contribution to the forecast error variance of the variable considered. From this analysis's[xvi] results, it appears that: domestic credit (CRI) is sensitive enough (21%) to innovations on money supply. Its variability is due at 77% to its own innovations and at 1.3% to innovations on nominal GDP. The credit private to the private sector (CRP) is sensitive at 36% to innovations on money supply M2. It reacts at 60% to its own innovations. The private sector's credit shows a high sensitivity to an expansive policy. Investment (INV) is very sensitive to money supply's (M2) innovations which explain at 60% the changes affecting it against 22% in respect to its own innovations. Finally, the GDP is highly sensitive (70%) to innovations on money supply M2. Production (GDP) very widely reacts to impulses on money supply. This result suggests that currency positively influences the productive sector.

A confirmation of the BEAC Weak Influence on Bank Credit Supply

The influence of money supply M2 is negligible on credit supply. This result confirms that of the causality test: money supply does not cause credit. BEAC monetary policy decisions are not therefore relayed (or very weakly) by secondary banks as far as their credit supply is concerned. Monetary policy transmission by bank credit channel thus appears defective in CEMAC zone as a whole. The bottleneck could be in the relationship Central Bank-secondary banks. CEMAC Zone banks do not increase their credits even in case of expansionary monetary policy. The existing

condition of bank lending channel above mentioned (effective capacity of the Central Bank to induce bank credit supply) is therefore not met. The BEAC zone monetary policy simply creates temporary disruption of banks' assets portfolio without changing their credit supply. A liquidity surplus, following an expansionary monetary policy, is rapidly placed in reserve in the Central Bank through an asset-liability management technique rather than to be used in credit supply (Payelle, 1996). The CEMAC zone banks' behaviour is rather disturbing the monetary policy transmission through credit channel.

Conclusion

Credit channel's measurement analysis in the CEMAC Zone on which our investigation is carried out helps assessing the monetary policy transmission otherwise than through a simple check on a causal interaction between financial and macroeconomic variables, representatives of real economy. This second procedure is often used in similar studies. But the measurement of credit channel's width, depth, speed and time limits of a debt economy like the one we have just studied seems more in line with the quantification of monetary policy decisions to guide the Central Bank's action. This led us to detect the CEMAC Zone credit channel's narrowness, the weak flow of the channel (that is to say, the weak influence of the BEAC on credit supply), its depth represented by the private sector's credit aggregate sensitivity to the Central Bank's impulses. Finally, we established a two-year time limit for the transmission of this policy to real economy. However, to correct the shortcomings noted, it would be wise to give more power to the Central Bank vis-à-vis secondary banks. For instance, it is worth defining a credit quota to be allocated to productive activities by each bank, particularly in terms of its monetary policy decisions. It appears therefore necessary to strengthen the control of banking activities, by ensuring that the BEAC's decisions are actually applied by banks. This balance should be in such a way that money supply corresponds to economic financing needs. Thus, as long as monetary policy cannot allow the banking system to fund capital formation which is a production and development tool, as long as it can't help to finance SMEs and SMIs which create

employment, as long as it cannot allow the restructuring of the productive system to go from an intermediation economy to production economy, it will remain ineffective for this zone. The question of monetary policy transmission efficiency through credit channel therefore lies in the perspective of a public action, able to generate necessary funds to push ahead the limits of maximum production potentials for economic emergence desired by the sub-regional leaders. The Central Bank could therefore be democratically controlled by the sub-regional parliament, so as to pursue an economic growth objective (in a dual mandate) coupled with that of monetary stability already underway.

Notes

[i] Unconventional monetary policies consist of three types of measures: 1) quantitative easing aimed at increasing the quantity of money in the economy; 2) Credit easing by the intervention of the Central Bank; and 3) the anticipated action on rates' curve to influence private agents' behavior.

[ii] United Nations Conference on Trade and Development (UNCTAD, 2000), Report 2000, p.31. United Nations Development Program (UNDP, 2000), Report on Human Development in the World, p. 120. Arnaud Zacharie, (2000), "The ten boundaries of the HIPC' initiatives," http: // HIPC limits. "The HIPC' Initiative, beyond the media effects," Debt and Development, www.initiative HIPC. United Nations Industrial Development Organization (UNIDO, 2006), 2006 report.

[iii] World Bank (1981). Accelerated Development in Africa south of the Sahara. This report is generally called Berg Report.

[iv] This is another reason for keeping currency introduced by Keynes in his analysis between 1937 and 1939.

[v] Hysteresis is a term borrowed from physical sciences which means that a system's equilibrium state is not independent of the path followed by this system to reach there. This argument is used by post-Keynesians against the idea of a conceived economy's spontaneous balance designed by classical economists.

[vi] Policy rates being already closed to zero, he proposes the use of unconventional policies.

[vii] Mundell Robert quoted by Bénassy-Querré (2004), p.324

[viii] Since the beginning of the Douala Stock Exchange's (DSX) operations on June 30, 2006, only three companies are listed as follows: the Cameroon mineral water Company (SEMC), Cameroonian subsidiary of the French group Castel; the Cameroon Agricultural and Forestry Company (SAFACAM) and the Cameroon Palm Corporation (SOCAPALM). On March 5, 2012 for example, the market capitalization amounted to 106,958,558,645 CFA francs, while the bond market capitalization stood at 219,335 billion CFA francs, a total of 326,293,558, 645 CFA francs funding.

[ix] The BVMAC sub-regional stock exchange recorded the following bonds: 100 billion FCFA by the Gabonese government in 2008; 7 billion FCFA by the Gabon Petro Company in 2010, 30 billion FCFA by the BDEAC to finance developmental projects in the sub-region.

[x] Particularly in developing countries' financial markets such as those of the CEMAC zone, many information asymmetries are observed between lenders and borrowers, institutional nominal rigidities in particular, and

market incompleteness leading to financial exclusion of many SMEs, of Very Small Enterprises and the working masses.

[xi] The Chairman of the Federal Reserve, the US Central Bank from 2005 to 2013, Ben Bernanke who successfully applied the lending channel model through "quantity easing", the monetary policy called quantitative easing with special performance which earned him the title of Man of the year in United State thanks to good measures taken to solve the 2007/2010 financial crisis.

[xii] The causalities of this relationship were tested below; they should be used in building the autoregressive vector's model (VAR).

[xiii] Stocks' and bonds' cumulative values of the two sub-regional financial markets' stock exchanges: Douala Stock Exchange (DXE) and the Central Africa Stock Exchange, the BVMAC of Libreville. Source: www.dxe.cm and www.bvmac.com official sites.

[xiv] Interview with the head of Association of Professionals of credit institutions in Cameroon (APEC), reported in the Cameroon national daily news, See Cameroon Tribune N°. 8650/4849 of July 27. 2006, p. 5.

[xv] Values in parentheses represent: for the 1st line, the standard deviations of the regression estimated coefficients; for the 2nd line, the calculated values of t-Student statistics. Their use leads to conduct significance tests of the estimated coefficients of this regression.

[xvi] The results of forecast error variances' analysis are available from the authors.

Appendices

Unit Root Test for M2, CRI, INV, PIB, CRP

Null Hypothesis: D(CRI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.656913	0.0000
Test critical values:	1% level	-4.148465	
	5% level	-3.500495	
	10% level	-3.179617	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CRI,2)
Method: Least Squares
Date: 11/11/16 Time: 18:21
Sample (adjusted): 3 53
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CRI(-1))	-0.980746	0.147327	-6.656913	0.0000
C	-4.72E+10	8.03E+10	-0.587652	0.5595
@TREND(1)	5.16E+09	2.68E+09	1.924720	0.0602
R-squared	0.480827	Mean dependent var		1.15E+10
Adjusted R-squared	0.459195	S.D. dependent var		3.73E+11
S.E. of regression	2.74E+11	Akaike info criterion		55.56834
Sum squared resid	3.61E+24	Schwarz criterion		55.68198
Log likelihood	-1413.993	Hannan-Quinn criter.		55.61176
F-statistic	22.22737	Durbin-Watson stat		1.967922
Prob(F-statistic)	0.000000			

Unit Root Test for M2

Null Hypothesis: D(M2,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-13.37324	0.0000
Test critical values:	1% level	-4.152511	
	5% level	-3.502373	
	10% level	-3.180699	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(M2,3)
Method: Least Squares
Date: 11/11/14 Time: 16:10
Sample (adjusted): 4 53
Included observations: 50 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(M2(-1),2)	-1.583592	0.118415	-13.37324	0.0000
C	-5.20E+10	5.63E+10	-0.925050	0.3597
@TREND(1)	3.25E+09	1.82E+09	1.785303	0.0807

R-squared	0.791893	Mean dependent var	1.38E+09
Adjusted R-squared	0.783037	S.D. dependent var	3.96E+11
S.E. of regression	1.84E+11	Akaike info criterion	54.77681
Sum squared resid	1.60E+24	Schwarz criterion	54.89153
Log likelihood	-1366.420	Hannan-Quinn criter.	54.82050
F-statistic	89.42248	Durbin-Watson stat	2.281168
Prob(F-statistic)	0.000000		

Unit Root Test for INV

Null Hypothesis: D(INV) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.474027	0.0002
Test critical values:	1% level	-4.148465	
	5% level	-3.500495	
	10% level	-3.179617	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INV,2)
Method: Least Squares
Date: 11/11/14 Time: 16:13
Sample (adjusted): 3 53
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INV(-1))	-0.766361	0.140000	-5.474027	0.0000
C	-1.68E+11	1.04E+11	-1.606054	0.1148
@TREND(1)	1.29E+10	3.94E+09	3.268651	0.0020
R-squared	0.384679	Mean dependent var		1.44E+10
Adjusted R-squared	0.359041	S.D. dependent var		4.27E+11
S.E. of regression	3.42E+11	Akaike info criterion		56.00870
Sum squared resid	5.60E+24	Schwarz criterion		56.12234
Log likelihood	-1425.222	Hannan-Quinn criter.		56.05213
F-statistic	15.00403	Durbin-Watson stat		2.055660
Prob(F-statistic)	0.000009			

Unit Root Test for GDP

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.19820	0.0000
Test critical values:	1% level	-4.148465	
	5% level	-3.500495	
	10% level	-3.179617	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 11/11/14 Time: 16:15
Sample (adjusted): 3 53
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-1.367523	0.134095	-10.19820	0.0000
C	-6.59E+11	3.97E+11	-1.658973	0.1036
@TREND(1)	6.18E+10	1.41E+10	4.393736	0.0001
R-squared	0.684224	Mean dependent var		3.37E+10
Adjusted R-squared	0.671067	S.D. dependent var		2.33E+12
S.E. of regression	1.34E+12	Akaike info criterion		58.73993
Sum squared resid	8.60E+25	Schwarz criterion		58.85357
Log likelihood	-1494.868	Hannan-Quinn criter.		58.78336
F-statistic	52.00321	Durbin-Watson stat		1.944518
Prob(F-statistic)	0.000000			

Unit Root Test for CRP

Null Hypothesis: D(CRP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.343592	0.0059
Test critical values:	1% level	-4.148465	
	5% level	-3.500495	
	10% level	-3.179617	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CRP,2)
Method: Least Squares
Date: 11/11/14 Time: 16:17
Sample (adjusted): 3 53
Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CRP(-1))	-0.590189	0.135876	-4.343592	0.0001
C	-4.10E+10	4.69E+10	-0.873627	0.3867
@TREND(1)	3.28E+09	1.62E+09	2.029136	0.0480

R-squared	0.284944	Mean dependent var	8.96E+09
Adjusted R-squared	0.255150	S.D. dependent var	1.84E+11
S.E. of regression	1.59E+11	Akaike info criterion	54.47409
Sum squared resid	1.21E+24	Schwarz criterion	54.58773
Log likelihood	-1386.089	Hannan-Quinn criter.	54.51752
F-statistic	9.563800	Durbin-Watson stat	2.068207
Prob(F-statistic)	0.000319		

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6 British imperialism and portfolio choice in the currency boards of Palestine, East Africa, and West

Tal **Boger** [†]

Introduction

As part of its imperial expansion in the 19th and 20th centuries, Great Britain set up currency board systems in many of its colonies. Establishing boards in colonies such as Palestine, East Africa, and West Africa, Britain sought monetary control over its colonies. Observers have questioned whether Britain organized the boards for its own good or for the development of its colonies. In his book *British Imperialism and the Makings of Colonial Currency Systems* (2016), Wadan Narsey cites changes in asset and security composition as proof that the boards benefited Britain at the expense of the colonies. Narsey categorizes the idea that the boards held securities in London "in order to maximize the income from… currency reserves, with complete safety" as a general misconception (Narsey 2016: 17). Rather, in his view, the securities served to ease Britain's balance of payments, finance British investment, and give Britain great authority over

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colonial finances. He describes a pattern whereby British colonial currency boards shifted their assets from higher-yielding, longer-maturity securities, often issued by other British colonies, into lower-yielding, shorter-maturity British government securities (Narsey 2016: 18). As a result, colonial governments received less revenue from the currency boards than they could have with a portfolio composition that could still preserve the fixed exchange rates of colonial currencies to the pound sterling.

Narsey points out that the London money market underwent several crises between 1890 and 1912, the period during which British officials established the template for colonial currency boards. The crises "had a central bearing on colonial currency policies… (in terms of) their holdings of undesirable British Government securities" (Narsey 2016: 158). In his discussion of academic writings on currency boards, Narsey concludes that "the evidence of our study supports that... while mercantilism was concealed or disguised in the nineteenth century, it had continued well into the twentieth century" (Narsey 2016: 209).

Narsey offers documentary evidence from unpublished government correspondence in Britain's Public Record Office (now the National Archives). He also shows the asset composition of several currency boards for select years. To make a more thorough test of the figures he calculates, this paper examinesfull annual data on the assets of the Palestine Currency Board, East African Currency Board, and West African Currency Board. They were among the largest British colonial currency boards, so their asset holdings were of particular importance for British policy regarding the "sterling area"—the colonies and independent countries that tied their currencies to the pound sterling, and that for most of the period from 1914 to 1972 had a common set of exchange controls against third currencies.

Methods

To test Narsey's claim, we first digitized the securities data from each currency board's annual report. Then, we classified each security into one of four categories: British Empire (other British colonies, mandates, and dominions), British national (British war loans, treasury bonds, etc.), British subnational (counties or cities

in England, British government-owned or government-guaranteed companies, etc.), and domestic (securities issued in colonies belonging to the currency board—for example, the East African Currency Board holding a Ugandan government or private security). The East and West African boards held domestic securities, while the Palestine Currency Board did not.

We copied the assets for each currency board from the digitized balance sheets published by Krus & Schuler (2014). Krus and Schuler digitized other balance sheet data, but not the details of securities holdings. We then analyzed the security and asset composition. For security composition, we used the four aforementioned categories. For overall asset composition, we used those four categories along with four other categories: deposits at banks, the Crown Agents,[2] etc.; British treasury bills; coin;[3] and other assets.[4]

We thenassessed the maturity and interest rate of the portfolio using two different methods. First, we calculated the average unweighted interest and maturity for different securities and classifications every year. Note that in some years, boards may not have held any securities of a certain security classification, so not all lines in our "by classification" charts span all years. Next, we calculated averages weighted by the amount of each security or asset held. The two methods show broadly similar results, so the graphs below show only the unweighted figures.[5] Some securities were callable, meaning that the issuer promised redemption at a specified date but had the option redeeming them at an earlier date. We calculated the portfolio using both the earlier and later

[2] The Crown Agents for the Colonies were a British government agency that offered fee-based financial management and other services to the colonies. Colonial governments were free to use private providers instead.

[3] We did not include every type of coin; we looked at coin in store at cost price and market value of coin in stock.

[4] For East Africa and West Africa, we added a domestic assets category in addition to the domestic securities category.

[5] Asset maturity for assets of zero or near-zero maturity, such as demand deposits, was weighted at 0.01 years. Securities with no explicit maturity, notably British consols, were assigned a maturity of 100.5 years – the .5 indicates that an assumption was made.

redemption dates. The graphs below show only the calculations using the later dates, which do not appreciably change our conclusions.

Because the overall portfolio of the currency boards determined the risk and return of their assets, the graphs focus on total assets, not just holdings of securities. We looked at assets both in terms of percentage of total assets and in terms of pounds, so as to contextualize the asset values (for example, British Empire securities made up most of the East African Currency Board's portfolio in some years, but in those years the overall portfolio value was small).

An accompanying spreadsheet workbook contains calculations of the securities portfolios alone, other calculations omitted from the graphs, and further data that will be of interest to readers who wish to explore the details behind our conclusions.

The charts included in the accompanying spreadsheets, but not in this paper are: weighted average interest and maturity, security composition (%), security composition (pounds), and average maturity by classification (unweighted).

Palastine currency board: Background[6]

Let us now consider each currency board in turn, starting with Palestine. During World War I, British forces conquered Palestine from the Ottoman Empire. In 1922 the League of Nations granted Britain a mandate over Palestine (now Israel and the Gaza Strip) and neighboring Transjordan (now Jordan). Under the League's rules, the country which was granted a mandate promised to develop it for the benefit of its inhabitants and not to annex the territory.

The conquering British forces had come from Egypt -which at the time was a British protectorate- and had brought Egyptian currency with them to use in payments. Egyptian currency displaced Ottoman currency.[7] The seignior age (profit from issuing the currency) accrued to the note-issuing National Bank of Egypt -

[6] Background information for all three currency boards is from either the Johns Hopkins University Digital Archive on Currency Boards or Krus & Schuler (2014).

[7] The Ottomans ruled Palestine from 1517 to 1917.

a privately owned commercial and central bank whose shareholders were British, French, and Egyptian- and to the Egyptian government, which issued the coins used in Palestine and Transjordan.

To enable the seignior age to accrue to the governments of Palestine and Transjordan, the British government founded the Palestine Currency Board on 15 June 1926. The board began issuing currency on 1 November 1927. Its currency was the Palestine pound, equal to the pound sterling, although subdivided into 1,000 mils instead of into 20 shillings or 240 pence like sterling. The board issued both notes and coins.

The initial members of the currency board were three Britons: P.H. Ezechiel, a Crown Agent for the Colonies; Leslie Couper, General Manager of the Bank of British West Africa; and A.J. Harding of the Colonial Office. The board was based in London.

The Palestine Currency Board's first annual report described its investment policy in these terms: "The Board may invest its funds in securities of the Government of any part of His Majesty's Dominions or in such other manner as the Secretary of State may approve. The extent to which investments may be made will be left to the discretion of the Board, whose duty it will be to hold, subject to any discretions which may be received from the Secretary of State, a proportion of its reserve in a liquid form" (Palestine Currency Board Annual Report 1928: 7). Observe that the board was not required by law to hold only external assets; the Secretary of State for the Colonies allowed it to hold domestic assets. However, in practice the board had no such holdings other than for petty cash for transitory purposes.

The Palestine Currency Board functioned without incident until 1947. In that year the proposed United Nations partition of Palestine into Arab and Israeli states led to a civil war when Arab leaders refused to accept the partition. Both the partition plan and the war raised the possibility that the new state(s) might not want to continue to be subject to a currency board controlled by the British government.

Israel declared its independence on 14 May 1948 and began issuing its own currency on 17 August 1948 through the Anglo Palestine Bank, its largest local financial institution. The Palestine

Currency Board continued to serve the West Bank, which had been absorbed by Jordan after the 1948 Arab-Israeli War, and the Gaza Strip, which was administered by Egypt. Jordan began issuing a separate currency to replace the Palestine pound under its own currency board on 1 July 1950. Egyptian currency replaced the Palestine pound in the Gaza Strip beginning in April 1951. Currency redemption ended on 9 June 1951, when the Palestine pound was declared no longer legal tender there. It ceased to be legal tender in Jordan on 30 June 1951. The board was liquidated on 17 June 1952.

Palestine currency board: Portfolio analysis

For Palestine, our results prove Narsey's claim correct. Over time, the currency board moved its portfolio into lower-yielding, shorter-maturity securities, which aligned with British interests. The graph below shows the unweighted average interest and years to average maturity each year. Aside from the years around 1936, the average interest decreased almost each year.

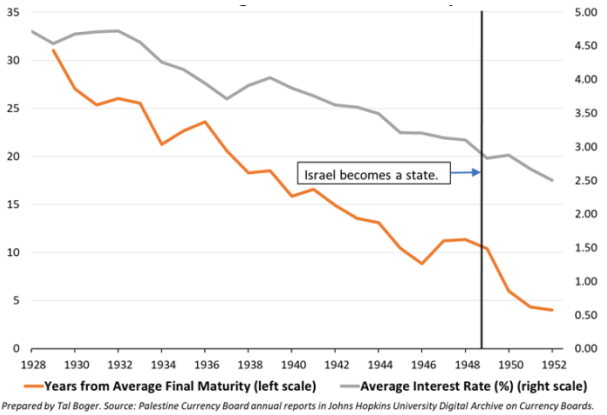

Figure 1. *PCB average interest and maturity*

In the graph on the next page, notice that the interest rate of British national securities (orange line)decreased consistently. British subnational securities' average interest rate (grey line) fluctuated; this is the result of using an unweighted average. The board did not hold many subnational securities, so each new subnational security affected the classification's average interest significantly. Overall, the portfolio held many British national

securities compared to Empire and subnational securities, giving the British national securities' average interest rate more statistical significance. The graph below shows the interest rates for each security class.

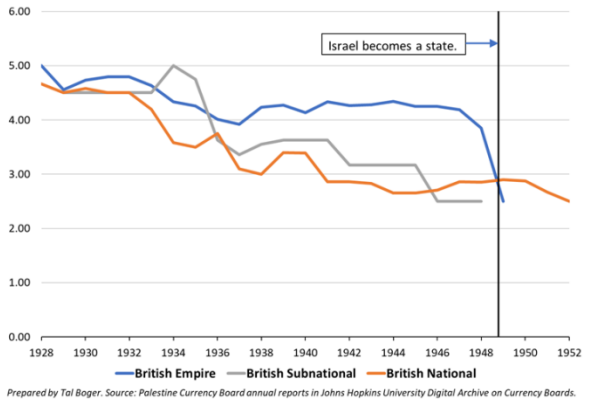

Figure 2. *Palestine currency borad average interest by classification (%)*

The asset composition shows the large holding of assets for British benefit. Deposits at banks, Crown Agents, etc. made up most of the assets until the liquidation phase; at that point, the board held a large portion of its assets in British treasury bills. In terms of securities, British national securities composed mostof the portfolio each year. The graph below shows the board's assets as a percentage of total assets.

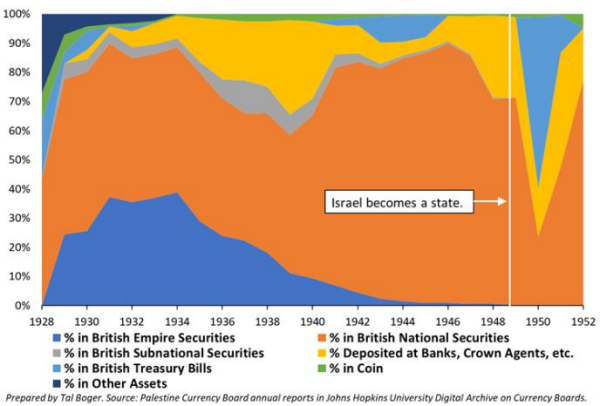

Figure 3. *Palestine currency board asset allocation (%)*

The graph below plots the same data in pounds to contextualize the assets in terms of total value. Notice that each year that the board maintained a large portfolio, it was overwhelmingly composed of British national securities, deposits, and British treasury bills.

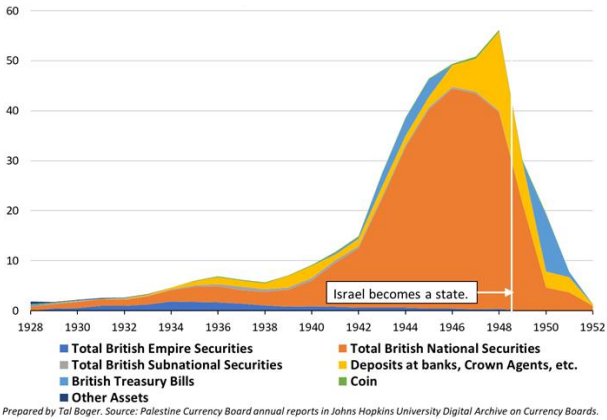

Figure 4. *Palestine currency board asset allocation (%)*

Our interest and maturity data support Narsey's hypothesis. The board increasingly held lower-interest, shorter-maturity securities over time. With its securities almost completely made up of British national securities, and its assets mostly composed of deposits and British treasury bills— both short-term securities for Britain —we conclude that the board's portfolio benefited Britain at some cost to Palestine and Transjordan.

East African currency board: Background

During World War I, British forces conquered Tanganyika from the Germans. At the time, Kenya and Uganda were British colonies, and Zanzibar was a British protectorate. Kenya and Zanzibar had local currency boards, which only issued notes, not coins. Kenyan notes circulated to some extent in Uganda. Britain established a currency board to unify currency in its East African colonies and to enable Uganda and Tanganyika to share in the profits of issue.

The British government established the East African Currency Board as a legal body in December 1919. There is some question

over when the board began issuing currency. Although it may have done so by about 22 May 1920, it is certain that it did so by 31 July 1920, when it took over the assets and liabilities of the Kenyan currency board. The official currency, the East African shilling, was equal to the British shilling at a 1:1 rate. However, there was also an informal yet widely used unit, the East African pound – 20 East African shillings equaled 1 East African pound, making the East African pound equal to the pound sterling. The East African shilling was a decimal currency divided into 100 cents.

Up until 1961, the board was headquartered in London. So, the securities data in the balance sheet were expressed in British pounds, shillings (20 per pound), and pence (240 per pound). However, on 22 August 1960, the board moved its headquarters to Nairobi, Kenya. Starting in 1962, the securities data were reported in East African currency, so the securities data were divided into cents.

The member countries of the board on the date of its establishment were Kenya, Uganda, and Tanganyika. In 1936, Zanzibar joined, ending its separate currency board. After World War II, the board further expanded, with Aden (later part of Southern Yemen, and now part of Yemen) and British Somaliland (now northern Somalia) joining.[8]

The initial governing members of the currency board were all Britons: W.H. Mercer, Senior Crown Agent for the Colonies; W.C. Bottomley, of the Colonial Office; and P.H. Ezechiel, Secretary to the Crown Agents).

The first annual report for the currency board uses the same terms later used for the Palestine Currency Board to outline its investment policy: "Subject to the provisions of paragraph 20 of these Regulations, the Board may invest their funds in securities of the Government of any part of His Majesty's dominions or in such other manner as the Secretary of State may approve" (East African Currency Board Annual Report 1920-1921: 8). No law required the

[8] The East African Currency Board held securities issued by both Aden and Zanzibar after they became members of the board, so these securities are defined under our "domestic" classification. During World War II and for some time after the board also issued currency in Italian colonies in the region that were conquered by British forces.

board to hold only British assets. Although the board did end up holding domestic securities and assets, their value was negligible compared to that of the British assets.

On 10 April 1969, the board ceased issuing currency. It was liquidated and its notes were demonetized on 31 December 1972. The board had ceased being the monetary authority of its member countries earlier, as the member countries had established their own central banks and become independent. British Somaliland gained independence on 26 June 1960 as part of Somalia; Tanganyika became independent on 9 December 1961; Uganda became independent in 1962; Kenya attained independence on 12 December 1963; Zanzibar gained independence in 1963; and Aden attained independence on 30 November.

East African Currency Board: Portfolio Analysis

For East Africa, we reached similar conclusions as those for Palestine. The maturity and interest of the portfolio declined over time, and the board's assets and securities were invested such that they would benefit Britain. The first chart on the following page shows the average interest and years from average maturity for East Africa. Although the interest rose in the final years of the board, this was caused by holding more domestic issues (not British securities) and very short-term, high-interest British national securities.

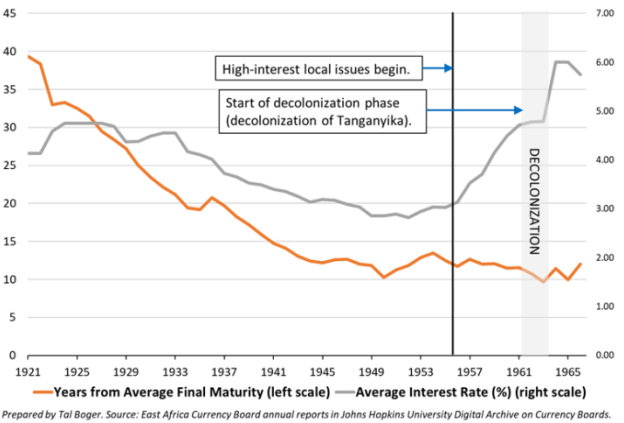

Figure 5. *EACB average interest and maturity*

The average interest rates on British Empire securities increased over time, while rates on British subnational and domestic securities remained relatively stable. The average interest of British national securities decreased until the board began holding high-interest conversion loans and treasury bonds. The chart below shows average interest rates by classification.

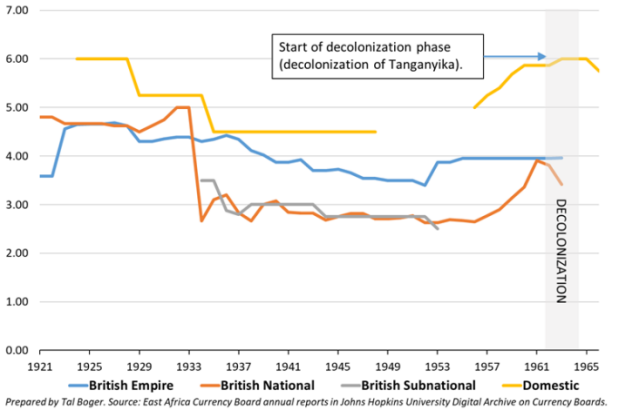

Figure 6. *East Africa currency board average interest by classification (%)*

In the first years of the board, most of the board's overall assets were in coin and other assets.[9] However, once the portfolio normalized, British national securities took over as the largest security class, and there was a large increase in deposits at banks, Crown Agents, etc. Near the decolonization dates of Tanganyika, Kenya, and Uganda, there was a sizable increase in British treasury bills. After the decolonization (essentially meaning that the board entered a liquidation phase)[10] the board maintained a large portion

[9] Other assets in this period are mostly Indian coin and the balance of silver coinage profit and loss account.

[10] We describe this period after decolonization as the liquidation phase because after decolonization, most member countries established central banks. Also, the final year of securities data was 1966 (5 years after the first decolonization date).

of its assets in deposits. The graph below shows the asset composition as a percentage of total assets.[11]

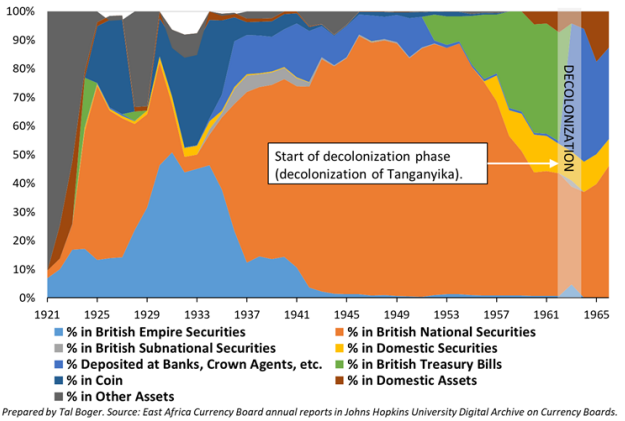

Figure 7. *East Africa currency board asset allocation (%)*

Like Palestine, during the period when the board managed a large portfolio, the portfolio was mostly composed of assets and securities for British benefit. Most notably, there were large holdings of British national securities, British treasury bills, and deposits. Both deposits and British treasury bills are short-term, low-interest assets.

Narsey further tests this claim; per his calculations, investments in the United Kingdom (excluding deposits and treasury bills) composed only 23 percent of securities in 1921. However, from 1946 on, they composed 99 percent of the portfolio (Narsey 2016: 277). The first graph on the following page shows the asset composition in shillings.

[11] The white space at the top between 1931 and 1933 is due to the fact that the percentage of other assets was negative. During those years, the board held a large portion of its assets in coin; the coin and the total securities alone equaled more than the total assets, giving us a negative value for other assets.

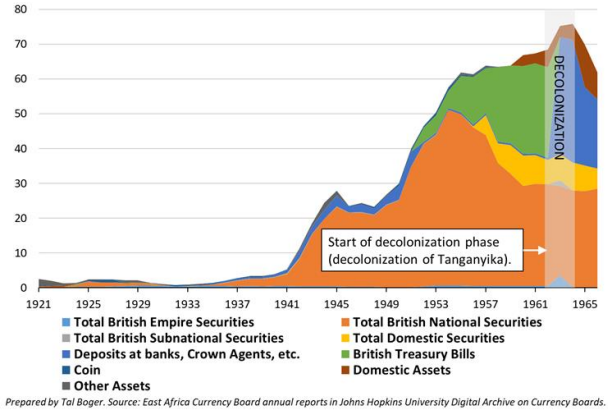

Figure 8. *East Africa currency board asset allocation (£)*

Our data for the East African Currency Board support Narsey's claim. Indeed, the average maturity and interest of the portfolio decreased over time (although, as discussed, the interest rate did rise after 1956 because of high-interest, short-term securities). Our portfolio analysis shows that British national securities, deposits, and treasury bills made up most of the portfolio almost every year. Therefore, we view the East African Currency Board as having benefited Britain at some expense to East Africa.

West African currency board: Background

Unlike the Palestine and East African currency boards, the West African Currency Board was not established because of territorial gain in World War I. The British established a currency board so that they could provide a local currency for their colonies in West Africa. They worried that British silver coins, which were then used in West Africa but whose legal tender was limited to £2 in the United Kingdom, could cause financial embarrassment for the British government if a large, sudden demand for their redemption arose in Africa. Separating West African currency from British currency was a way of quarantining demands for redemption so that they did not undermine the credibility of the pound sterling.

The board was founded before World War I began. Members were appointed on 21 November 1912, and weeks later, on 6 December 1912, the board was established. It began issuing currency on 26 June 1913. Its currency, the British West African

pound, was equal to the pound sterling at a 1:1 rate. Like sterling, it was divided into shillings (20 per pound) and pence (240 per pound).

Initially, the board covered Gambia, the Gold Coast (now Ghana), Nigeria, and Sierra Leone. After World War I, Cameroons (now divided between Nigeria and Cameroon) and Togoland (now part of Ghana) became British mandates supervised by the League of Nations. Cameroons was administered as part of Nigeria, and Togoland as part of Ghana, so both used West African currency. Liberia also used West African currency, but it was not a member of the board and did not receive a share of the profits.

The West African Currency Board was also headed by three Britons: G.V. Fiddes, from the Colonial Office; W.H. Mercer, Senior Crown Agent for the Colonies; and L. Couper, General Manager of the Bank of British West Africa. Further, the board was headquartered in London, and Mercer and Couper were later members of the East African Currency Board.

The provisions governing investment were very general: "The Board will maintain in London against the silver coinage a reserve of gold and securities, hereafter referred to as the 'gold standard reserve'" (West Africa Currency Board Annual Report 1914: 7). There were no guidelines stating that the board could not hold a certain type of security, or that it must hold British securities.

In his exploration of the history of the West African Currency Board, Narsey also finds two other characteristics defining its investments: the local currency would be backed 110 percent by gold and sterling reserves in London, and 10 percent of the currency reserves would be kept as a Depreciation Fund to guard against the depreciation of the sterling securities (Narsey 2016: 146). These terms seem overly strict to him, especially the requirement of keeping 10 percent of currency reserves in a depreciation fund. He adduces these condition as evidence that Britain leveraged the colonial currency to help the sterling and British securities.

Because of the independence of the West African colonies, the board ceased issuing currency on 31 May 1968, and was fully liquidated on 31 October 1973.The Gold Coast became independent on 6 March 1957; Nigeria became independent on 1

October 1960; Sierra Leone gained independence on 27 April 1961; Gambia obtained independence on 18 February 1965. Each country established a national currency authority around the time of its independence.

West African Currency Board: Portfolio Analysis

For our third and final currency board, our results were similar to the other two. The board over time shifted its portfolio to shorter-maturity, lower-interest securities for British benefit. Like East Africa, West Africa's average interest and maturity steadily declined until the final years of the board, at which point the interest rose dramatically.

For West Africa, this rise in interest was mostly caused by high-interest Exchequer loans[12] and treasury stock (all of which had over 6 percent interest), and British subnational securities. In 1969 there was a group of loans called the "local authority bonds," composed of 11 subnational securities, with the lowest interest rate among them being 8.375 percent. The graph below shows the average interest and maturity.

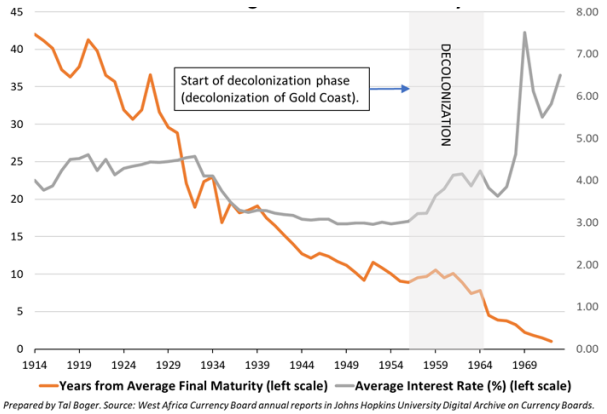

Figure 9. *WACB average interest and maturity*

Examining the interest by classification helps explain the large rise in interest. Notice how after 1968, the average interest for British subnational securities is about 9 percent because of higher

[12] The Exchequer was the department of the British Treasury responsible for taxes and accounting.

inflation. Also, in the middle of the decolonization phase, the average interest of British national securities begins to rise. The graph below shows the average interest by classification.

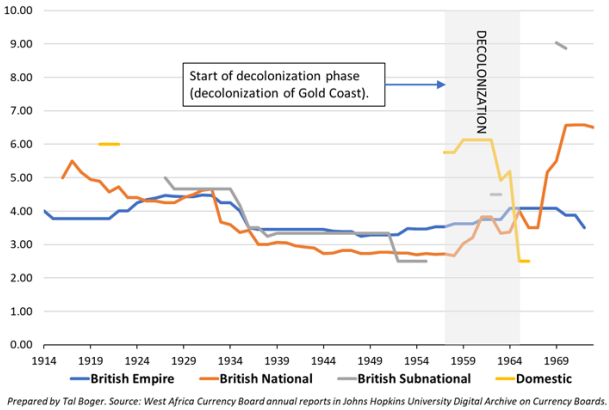

Figure 10. *West Africa currency board average interest by classification (%)*

After the first years of the board, during which other assets made up most of the portfolio, the highest-valued assets were British treasury bills and deposits at banks, Crown Agents, etc. Along with the British assets, most of the portfolio's securities were British national. The graph below shows the asset composition as a percentage of total assets.

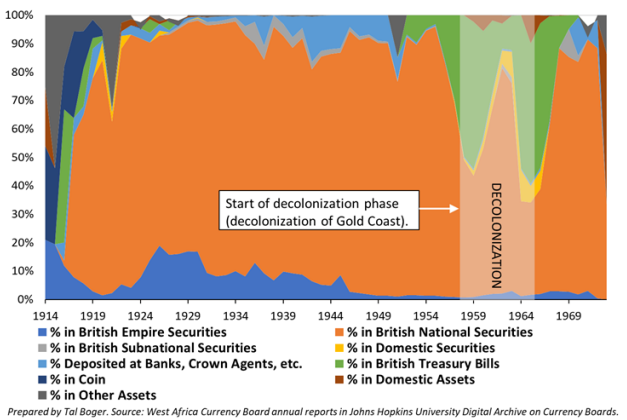

Figure 11. *West Africa currency board asset allocation (%)*

The asset composition in pounds further shows the large holding of these short-term assets, especially British treasury bills. The graph below shows the asset composition in pounds.

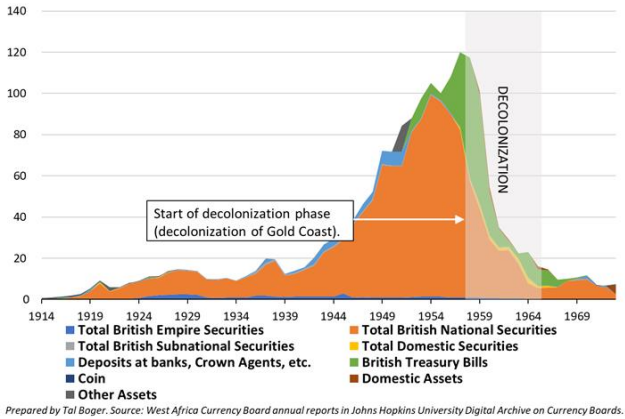

Figure 12. *West Africa currency board asset allocation (£)*

Our analysis of West Africa's currency board proves Narsey's claim correct. Furthermore, West Africa's currency board was a model to other British currency boards, so its shift of securities and assets for British benefit might well be seen in other boards too.

Conclusion

The results from our statistical analysis of three different British colonial currency boards (Palestine, East Africa, and West Africa) prove Wadan Narsey's (2016) claim correct. Each board shifted its assets to lower-yielding, shorter-maturity securities over time, which benefited Britain at some expense to the colonies. Even when the boards could invest in other securities, they continued to compose their portfolios and assets of British national securities and assets. Furthermore, initially no representatives from British colonies had a seat on the governing board; all three members on each board at its inception were in the British government. As such, we conclude that the policies of the currency boards enabled Britain to manipulate its colonies' monetary systems for its own benefit.

To examine the extent to which the portfolios benefitted Britain, we created a model portfolio. The model portfolio held 75 percent of its assets in Empire securities (we used Australian bonds for this), 15 percent national securities (10 year British Treasury bills), and 10 percent deposits. We compared this to the weighted interest of the actual portfolio. Even with deposits weighing down on the model portfolio – while they were not included in the real one – both East and West Africa's model portfolios outperformed their real portfolios. The graph below shows the difference in value of the model and real portfolios (with the initial year equal to £100 for both portfolios).

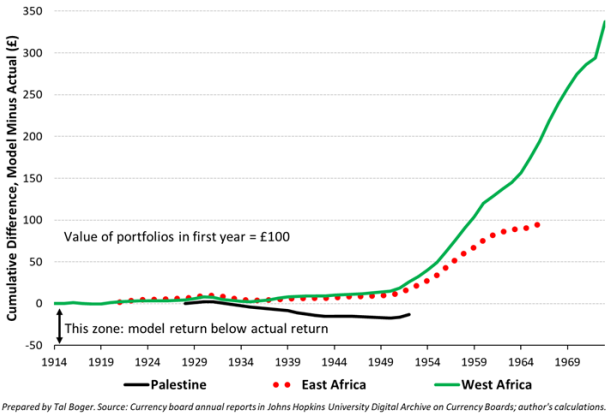

Figure 13. *Currency board model portfolio vs. actual portfolio*

The portfolio policies of the currency boards this paper has examined were more concentrated in low-yielding British assets than they needed to be, benefiting Britain and reducing income for the currency boards and the colonial governments that belonged to them. As for the broader question of whether the monetary policy of the currency boards themselves was disadvantageous to the colonies, this is not the place to address it, but both a study by Schuler (1994) using simple statistical techniques, and a more sophisticated study by Wolf *et al.*, (2008) indicate that currency board systems have tended to have less currency depreciation and lower average inflation rates than central banking system in emerging market countries. For instance, of the countries that belonged to the currency boards analyzed here, only one, Jordan,

has a currency that has kept its value against the pound sterling; the Jordanian dinar is currently worth about £1.10. All the other currencies have depreciated against sterling by a factor of at least 10. In Nigeria, for instance, the factor of depreciation is about 230. In Israel it is more than 40,000, adjusting for the changes of currency since independence.

Great Britain set up currency boards in colonies aside from Palestine, East Africa, and West Africa. These included major colonies such as Malaya, Iraq, Burma, and the British Caribbean, and many smaller colonies, such as British Honduras, Malta, and Zanzibar. These currency boards could also be tested using our methods to see if they, too, show a pattern of asset holdings that benefited Britain at the expense of the colonies.

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